Were Our Mathematics Textbooks a Mile Wide and an Inch Deep?

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Abstract

Three mathematics textbooks of different grade levels, compared with Chinese math textbooks of the same grades, were selected that were used in some of the middle schools in Clark County Schools District (CCSD).

Systematical review of the three textbooks were made grade by grade in order to figure out "Are Our Math Textbooks a Mile Wide and an Inch Deep?" It was found that many contents of these math text books were overlapped and repeated from previous grades to upper grades. In these three incoherent courses, topics were highly repetitive. It was noticed that approximately 20% of the contents were new and introduced into upper grade levels. 80% of the contents were re-taught from previous grades. Because of that, much time was spent every year reviewing and re-teaching the same topic again and again. 7^{th} and 8^{th} grade students were still learning basic arithmetic such as fractions, decimals, order of four operations, where Chinese students of the same grade moved on to algebra and geometry and trigonometry topics because the writer looked into Chinese mathematics textbooks from 6^{th} grade to 8^{th} grade. It was found that the Chinese math textbooks covered fewer topics than the U.S. math textbooks for the same grade. The Chinese math textbooks had fewer pages than those of the U.S. math textbooks because the Chinese math textbooks had little graphics or no problems asking students to use a calculator to find the correct answers. The Chinese math textbooks had 90% new contents. Chinese math concepts were taught to mastery. Each concept built upon the next; students were encouraged to move on. What had been taught in Chinese math classrooms was never re-taught and only revisited later. Chinese students outperformed the Unites States because they had uniform national standards.

Chinese math textbooks had little repetition. Besides, Chinese curriculum focused on fewer content areas, but dealt with them in greater depth.

It was found that *enVision* Math textbook (5^{th} grade) was used in some elementary schools of CCSD. If students were taught to master the concepts of mathematics from *en*Vision math textbook, those students could study pre-algebra or algebra I in 6^{th} grade because *en*Vision math textbook covered nearly all that was taught in Course 1, Course 2, and even in Course 3.

Researchers thought that if students obtained satisfactory achievement results, the curriculum was powerfully linked to them. It was hoped that there would be, in the United States, a set of national standards/curricula at each grade level so that math textbooks would be compiled on the basis of these uniform standards/curricula even if each state wanted to have her own edition of mathematics textbooks because a coherent set of national standards/curriculum would help students gain their desirable academic achievement results.

Pages

Chapter I

Introduction

In the past six years, the writer was assigned to work in sixth grade, seventh grade, and eight grade math classrooms. It was found that the contents of each grade math textbook were repeated nearly 80% that had been taught from previous grades. Even if 80% of the contents were taught from previous grades, students were still unable to master what were supposed to have mastered. Attention was brought to the writer why students were unable to master these contents. Focuses were made on mathematics textbooks. The writer mainly looked into the three mathematics textbooks (*Course 1, Course 2, and Course 3*, Holt, Nevada Version, Copyright 2007) which were used in some of the middle schools in Clark County Schools District (CCSD), Nevada. It was said that *Course 1* was used for Grade 6, *Course 2* used for Grade 7, and *Course 3* used for Grade 8. Besides, the writer analyzed Chinese 6^{th} grade, 7^{th} grade, and 8^{th} grade mathematics textbooks (*People's Education Press, Beijing, China 2006*) to show the contrast between the math textbooks of the two countries. It was found that many contents of these Holt mathematics textbooks were overlapped and repeated from previous grades to upper grades. In these three incoherent courses, topics were highly repetitive and unfocused. It was noticed that approximately 20% of the contents were new and introduced into upper grade levels. 80% of the contents were re-taught from previous grades. Therefore, every year much time was spent reviewing and re-teaching the same topic again and again. As shown in Table 1B (on *pp*. 43-64), the contents of "Exponents" were taught across three grades, 1-3 in *Course1*, 1-2 and 1-4 in *Course 2*, and 4-1 in *Course 3* (see the table on page 43). "Order of Operations" should have been taught and mastered in an elementary school, but it was repeated in 1-4 in *Course 1* and 1-5

in *Course 2* (see the table on page 43). "Equations and Their Solutions" were repeated across the three grades in the sections of 2-2, 2-4, 2-5, 2-6, 2-7, and 2-8 in *Course 1*, 1-10, 1-11, and 1-12 in *Course 2*, and 1-7, 1-8, 2-6, 2-7 in *Course 3* (see the table on page 44). "Representing, Comparing, and Ordering Decimals" were taught across three grades such as 3-1 in *Course1*, 2-11 in *Course 2*, and 6-1 in *Course 3* (see the table on page 46). In *Course1, Course 2*, and *Course 3*, "Decimals and Fractions" were taught and re-taught across three grades. 7th and 8th grade students were still studying basic arithmetic such as fractions, decimals, order of operations, while Chinese students of the same grade moved on to algebra and geometry and trigonometry topics because the writer also looked into Chinese math textbooks from 6th grade to 8th grade. Their mathematics curricula were continued from previous grade levels as seen from the contents of 6th grade in Table 5 on *pp*. 211-212, 7th grade in Table 6 on *pp*. 213-215 and 8th grade in Table 7 on *pp*. 216-217. As was known to all, the U.S. math textbooks had a lot of repetition. "Researchers blame this pattern on the heavy repetition of basic skills that begins in 5th grade and persists through 8th grade. Students fall so far behind in those years that they never have a chance to catch up. The middle school math … curriculum is an intellectual wasteland. We seriously deprive our kids of intellectual work during those years." [1]

Wenyuan Gu (1997) mentioned in his article *The Differences of mathematics Achievements Between American Children and Chinese Children* that "Math and science curricula in the United States lack a coherent vision of how to educate students, compared with the coursework of other countries, ...The U.S. curriculum is a mile wide and an inch deep" (p.23). It was found that Chinese mathematics textbooks covered fewer topics than the U.S. mathematics textbooks for the same grade. The Chinese math textbooks had fewer pages than the U.S. math textbooks because the Chinese math textbooks had little graphics or no problems

asking students to use a calculator to find the correct answers or the mean of a set of numbers. In Chinese math textbooks there were no multiple choice problems. Students solved all problems, showing paper-pencil work (No work, No credit). The Chinese math textbooks had 90% new contents as seen from Table 5 to Table 7 on *pp*. 211-217, where it showed the contents which were not repeated. From the 7th grade and 8th grade Chinese mathematics books, the content areas were continued from previous grade. Each concept built upon the next. Students were encouraged to move on. Chinese math concepts were taught to mastery. What had been taught was never re-taught and only revisited later. Chinese students outperformed the students of the Unites States because they had uniform national standards. Chinese math textbooks had little repetition. It was hoped that there would be, in the United States, a set of national standards for academics at each grade level so that math textbooks would be compiled on the basis of these uniform standards because a coherent set of national standards would provide students good academic foundation and help them move on as well as help the nation keep pace globally. Researchers thought that "…the curriculum is powerfully linked to achievement results." [2]

Unfortunately, "… many states have weakened standards in the past decade to help schools meet requirements of the 2002 No Child Left Behind law." [3] Cris Prystay (2004) pointed out "Under the Bush administration's No Child Left Behind policy, funding and jobs depended on how each school rates on standardized state exams. Many districts are reluctant to try something new for fear of slipping up on those exams."[14] There was little double that these Holt math textbooks might have been compiled on the basis of such expectations. From the writer's point of view, a good curriculum should start and be introduced from kindergarten level. Elementary schools were the stages of great importance so far as students' academics foundation was concerned. Their good math foundation laid in elementary schools would pave their way to

move on for the upper grade levels, and that was very essential and extremely important for students in middle schools never to study four operations of whole numbers again.

It was found that *enVision* math textbook was used for the 5th grades in some of the elementary schools in CCSD. The writer wondered whether there would be a good connection or linkage of mathematics concepts from 3rd and 4th grades to the *enVision* math textbook. If the students did not master number sense, number facts, place value, patterns, visualization, and computation from previous grades, it would take a teacher some time to help students review some content areas before *enVision* math text book was used. The contents of the *enVision* math textbook was good from the writer's point of view, but the questions were, "Do the 5th graders have such ability as to use the math textbook if they did not master what was supposed to master in previous grades?" "Can the 5th graders complete and master what the book was designed by the end of academic year?" because the *enVision* math textbook covered a lot of contents area (see Table 4 on page 198). If 5th graders were able to complete the book and master the concepts of mathematics in a year, they would feel much comfortable to study Pre-algebra or Algebra I in middle schools, thus eliminating a great amount of repetition and definitely improving CCSD students academic achievement. It was hoped that the school district would pay attention to examining and reviewing the results of the use of *en*Vision math textbook in order to know how much improvement students were made.

It was hoped that each state or local district would follow the Common Core State Standards for Mathematics under the guidance of the Common Core State Standards Initiative.

Chapter II

The Problem

The purpose of this study was to determine whether mathematics textbooks used by some middle schools in Clark County School District (CCSD), Nevada, were "A Mile Wide and an Inch Deep?" In particular, the study was intended to seek answers to the following questions:

1. Were the contents of each book repeated?
2. Were the concepts of each book overlapped?
3. Were the concepts of each book unfocused?
4. Were the mathematics textbooks "A Mile Wide And an Inch Deep"?

Chapter III

Procedures

To obtain information for answering the research questions set forth in this study, the following steps were taken:

1. Three mathematics textbooks (*Course 1*, *Course 2*, and *Course 3*) were selected that were used in some of the middles schools in Clark County Schools District (CCSD), Nevada. It was found that *Course 1* was used for Grade 6, *Course 2* was used for Grade 7, and *Course 3* was used for Grade 8.

2. The writer gathered some information from *Mathematics Course 1*, Holt (Nevada Version, Copyright 2007). The writer did not copy all the examples or explanation or vocabulary from the book. In *Course 1 Mathematics Textbook*, there were 12 chapters which contained 112 sections including 5 extension sections. Systematical analyses were made of every section in each chapter to find whether or not the contents were "a mile wide and an inch deep."

3. The writer gathered some information from *Mathematics Course 2*, Holt (Nevada Version, Copyright 2007). The writer did not copy all the examples or explanation or vocabulary from the book. Some details of examples were omitted on purpose. In *Course 2 Mathematics Textbook*, there were12 chapters which contained 112 sections including 7 extension sections. Systematical analyses were made of each section from each chapter to find whether or not the contents were "a mile wide and an inch deep."

4. The writer gathered some information from Mathematics *Course 3*, Holt (Nevada Version, Copyright 2007). The writer did not copy all the examples or explanation or vocabulary from the math textbook. Some details of examples were omitted on purpose. In *Course 3*

Mathematics Textbook, there were 14 chapters which contained 111 sections including 3 extension sections. Systematical analyses were made of each section from each chapter to find whether or not the contents were "a mile wide and an inch deep."

5. The writer used the information gathered from the three mathematics textbooks in order to compare the contents to see whether they were repeated or overlapped.

6. The writer also selected Chinese 6th grade mathematics textbook (*People's Education Press, Beijing, China 2006*), 7th grade math textbook (*People's Education Press, Beijing, China2006)*, and 8th grade math textbook (*People's Education Press, Beijing, China2006*)

7. The writer read some literatures from other professional papers to gather information to support his investigation.

8. The writer found that some of the elementary schools in CCSD used *enVision Mathematics* textbook for 5th graders. The writer read the textbook and used the information from the textbook to compare some of the contents used in *Course1*, *Course2*, and *Course 3*.

Chapter IV

Findings

The following was the information the writer selectively typed from *Mathematics Course 1*, Holt (Nevada Version, Copyright 2007), *Mathematics Course 2*, Holt (Nevada Version, Copyright 2007), and *Mathematics Course 3*, Holt (Nevada Version, Copyright 2007). The writer did not type all examples or explanation or vocabulary from each textbook, but the writer listed nearly all contents typed from each text book. Therefore, the contents of Table 1A (*Course 1* shown on *pp*. 10-42), Table 2A (*Course 2* shown on *pp*.72-106), and Table 3A (*Course 3* shown on *pp*.131-165) were stated respectively. Systematical analyses were made of every section in each chapter from each course to find whether or not the contents were "a mile wide and an inch deep." Details of contents repetition or re-taught from each chapter of *Course 1, Course 2*, and *Course 3* were indicated in Table 1B (*Course 1* on *p*.43), Table 2B (*Course 2* on *p*. 107), and Table 3B (*Course 3* on *p*. 166), which the writer typed and organized from those mathematics courses. *Note* was also indicated in some sections of each course in Table 1A, Table 2A, and Table 3A.

A. Mathematics *Course 1*

In *Course 1 Math Textbook*, there were 12 chapters which contained 112 sections including 5 extension sections. Mathematics *Course 1* had 827 pages long. Systematical analyses were made of every section in each chapter to find whether or not the contents were "a mile wide and an inch deep." Great details were also indicated in Table 1B. From Table1B (on page 43),

many of contents were seen being repeated or overlapped in each grade. Some of typical examples of repletion or overlapping were stated in the following. The writer did not type all of the examples that were shown to be repeated or re-taught in the following statement. Table 1B (on *p*. 43) was clearly shown which content was to be taught or to be re-taught, *etc*. It was found that about 20% of the contents were new. The rest of them were re-taught.

As shown in Table 1B, the contents of "Exponents" were taught, for example, across three grades, i.e., 1-3 in *Course1*, 1-2 and 1-4 in *Course 2*, and 4-1 in *Course 3*. "Order of Operations" should have studied in an elementary school, but it was repeated in 1-4 in *Course 1* and 1-5 in *Course 2*. "Equations and Their Solutions" were repeated across the three grades, i.e., sections of 2-2, 2-4, 2-5, 2-6, 2-7, and 2-8 in *Course 1*, 1-10, 1-11, and 1-12 in *Course 2*, and 1-7, 1-8, 2-6, and 2-7 in *Course 3*. "Representing, Comparing, and Ordering Decimals" were taught across three grades, i.e.,3-1 in Course1, 2-11 in *Course 2*, and 6-1 in *Course 3*. "Decimals and Fractions" were students' weak parts. In *Course1*, *Course 2*, and *Course 3*, decimals and fractions were taught and re-taught across three grades, but students still did not master them. "Addition Equations" was repeated in 2-5 in *Course 1*, 1-11 in *Course 2*, and 1-7 in *Course 3*. "Multiplication Equations" was repeated in 2-7 in *Course 1*, 1-12 in *Course 2*, 1-8 in *Course 3*. "Multiplying Decimals" was repeated in 3-5 in *Course 1*, 3-3 in *Course 2*, and 2-4 in *Course 3*. As seen from Table 1B (on *p*. 43), many contents were repeated or overlapped across these three courses, *etc*.

B. Table 1A

(Mathematics *Course 1*)

Table 1A showed the contents of Mathematics *Course 1* Textbook, where there were 12 chapters which contained 112 sections including 5 extension sections. Mathematics *Course 1* had 827 pages long. Additional comments were also made on some sections or chapters. The writer sometimes gave a *Note* at the end of some sections in certain chapters.

Chapter 1

Whole Numbers and Patterns

Chapter 1 dealt with Numbers and Patterns. There were 7 sections in it.

1-1 Comparing and Ordering Whole Numbers

Example 1 Using Place Value to Compare Whole Numbers
Example 2 Using a Number Line to Order Whole Umbers

Note: In the section, Place Value Table, Standard Form, Expanded Form, and Word Form were indicated. That was vital for students to self-study them.

1-2 Estimating with Whole Numbers

Vocabulary *compatible number underestimate overestimate*

Example 1 Estimating a Sum or Difference by Rounding
Example 2 Estimating a Product by Rounding
Example 3 Estimating a Quotient Using Compatible Numbers

1-3 Exponents

Vocabulary *exponent base exponential form*

Example 1 Writing Numbers in Exponential Form

$4\times4\times4 \rightarrow 4^3$

Example 2 Finding the Value of Numbers in Exponential form

$2^7 \rightarrow 2\times2\times2\times2\times2\times2\times2 = 128$

Example 3 PROBLEM SOVLING APPLICATION

1-4 Order of Operations

Vocabulary *numerical expression* *evaluate* *order of operations*

Example 1 Using the Order of Operations

$9 + 12 \times 2 \rightarrow 9 + 24 = 33$, $7 + (12 \times 3) \div 6 \rightarrow 7 + 36 \div 6 \rightarrow 7 + 6 = 13$

Example 2 Using the Order of Operations with Exponents

$3^3 + 8 - 16 \rightarrow 27 + 8 - 16 \rightarrow 35 - 16 = 19$

Example 3 Consumer Application

1-5 Mental math

Vocabulary *Commutative Property* *Associative Property* *Distributive Property*

Example 1 Using Properties to Add and Multiply Whole Numbers

$12 + 4 + 18 + 46 \rightarrow (12 + 18) + (4 + 46) \rightarrow 30 + 50 = 80$

Example 2 Using the Distributive Property to Multiply

$4 \times 23 = 4 \times (20+3)$

1-6 Problem solving Skill: Choose the Method of Computation

Example 1 Choose a solution method and solve.

$867 - 59 \rightarrow (867 + 1) - (59 + 1) \rightarrow 868 - 60 = 808$

1-7 Pattern and Sequences

Vocabulary *sequence* *term* *arithmetic sequence*

Example 1 Extending Arithmetic Sequences

A) 3, 15, 27, 39, ____, ____, ….

A pattern is to add 12 to each term to get the next term.

Example 2 Completing Other Sequences

B) 1, 6, 2, 12, ____, 24, 8, _____, 16

$\times 6, \div 3, \times 6, \div 3, \times 6 \div 3, \times 6, \div 3,$

A Pattern is to multiply one term by 6 and divide the next by 3.

Chapter 2

Introduction to Algebra

Chapter 2 dealt with Introduction to Algebra. There were 9 sections including an extension section.

2-1 Variables and Expressions

Vocabulary *variable constant algebraic expression*

Example 1 Evaluating Algebraic Expressions

$w \div 3$ when $w = 55$, $4 \times n + 6^2$

Example 2 Evaluating Expressions with Two Variables

$l \times w$ for $l = 4$ and $w = 2$

2-2 Problem Solving Skill: Translate Between Words and Math

Example 1 Social Studies Applications

n -4,000

Example 2 Translate Words into Math

b divided by 14 → $b \div 14$ or $\frac{b}{14}$

Example 3 Translating Math into Words

$a - 45$ → a minus 45 or take away 5 from a

Note: There were several different ways to write math expressions with words. A table was shown on p.59.

2-3 Translating Between Tables and Expressions

Example 1 Write an Expression

Write an expression for the missing value in each table.

When Reilly's age is n, Ashley's age is $n + 2$.

Example 2 Writing an Expression for a Sequence

Write an expression for the sequence in the table.

The expression for the sequence is $2n + 1$.

Example 3 Writing an Expression for the Area of a Figure

8 (base (*in.*)) × *h(*height *in.)* = 8*h* (in^2)

In each row of the table, the area is half the product of the base and the height. The expression is $\frac{8h}{2}$, or $4h$.

2-4 Equations and Their Solutions

Vocabulary *equation solution*

Example 1 Determining Solutions of Equations

$a + 23 = 82$ for $a = 61$, $60 \div c = 6$ for $c = 10$, etc.

Are they equal or not?

Example 2 Life Science Application

$12f = i$ for $f = 13$ and $i = 156$

Note: Determine whether the given value of each variable is a solution that also appeared on page 95.

2-5 Addition Equations

If an equation contains addition, solve it by subtracting from both sides to "undo" the addition

Example 1 Solving Addition Equations

$x + 62 = 93$ $\quad$ $81 = 17 + y$

$-62 \quad -62$ $\quad$ $-17 \quad -17$

$x = 31$ $\quad$ $64 = y$

Example 2 Social Studies Application

$25 = 6 + d \rightarrow 19 = d$

2-6 Subtraction Equations

When an equation contains subtraction, use addition to "undo" the subtraction. Remember to add the same amount to both sides of the equation

Example 1 Solving Subtraction Equations

$p - 2 = 5$ $\quad\quad$ $40 = x - 11$ $\quad$ $x - 56 = 19$

$+ 2 \quad +2$

$P = 7$

2-7 Multiplication Equations

Example 1 Solving Multiplication Equations

$3x = 12$ $\quad\quad$ $8 = 4w$

Example 2 Problem Solving Application

$A = lw$

2-8 Division Equations

Example 1 Solving Divisions Equations

$\frac{y}{5} = 4$ $\quad$ $12 = \frac{z}{4}$

Example 2 Physical Science Application

$15 = \frac{p}{2}$

Extension Inequalities

Vocabulary *inequality*

Examples 1 Graphing Inequalities

Example 2 Solving and Graphing Inequalities

$y + 7 < 9$ $\quad\quad$ $2m \geq 12$

Note: The extension section should be moved to Chapter 1 of *Course 2*.

Chapter 3

Decimals

Chapter 3 dealt with decimals. There were 9 sections in it.

3-1 Representing, Comparing, and Ordering Decimals

Example 1 Reading and Writing Decimals

1.05

Expanded form: 1 + 0.05

Word form: one and five hundredths

Example 2 Earth Science Application

$0.12 < 0.50$

Example 3 Comparing and Ordering Decimals

Order the decimals from least to greatest.

12.35, 14.3, 14.05 → 14.5, 14.30, 14.35

3-2 Estimating Decimals

Vocabulary *clustering* *front-end estimation*

Example 2 Rounding Decimals to Estimate Sums and Differences

3.92 + 6.28; ones → 4 + 6 = 10

8.6355 – 5.039; hundredths → 8.64 – 5.04 = 3.60

Example 3 Using Compatible Numbers to Estimate Products and Quotients

$26.76 \times 2.93 = 25 \times 3 = 75$, $42.64 \div 16.51 = 45 \div 15 = 3$

Example 4 Using Front-End Estimation

9.99 + 22.89 + 8.3 → 9 + 22 + 8 =39

0.99 + 0.89 + 0.30 → 1.00 +1.00 +0.50 = 2.50

39.00 + 2.50 = 41.50

3-3 Adding and Subtracting Decimals

Example 2 Using Mental Math to Add and Subtract Decimals

1.6 + 0.4 = 2 3- 0.8= 2.2

Evaluating Decimals Expressions

Evaluate 7.52 – *s* for each value of *s*.

A) s = 2.9 7.52 – *s* 7.52 -2.9 = 4.62, *etc*

3-4 Scientific Notation

Vocabulary *scientific notation*

Example 1 Multiplying by Power of Ten

4,325 ×1,000 = 4,325,000

2.54 × 10,000 = 25,400

Example 2 Writing Numbers in Scientific Notation

8,296,000 →8.296×10^6

Example 3 Writing Numbers in Standard Form

$3.2 \times 10^7 \rightarrow$ 32,000,000

3-5 Multiplying Decimals

Example 2 Multiplying a Decimal by a Decimal

0.2 × 0.6 = 0.12

3.25 × 4.8 =15.600

0.05 × 0.9 =0.045

Example 3 Evaluating Decimal Expressions

Evaluate 3x for x = 4.047 → 3x = 3(4.047) → 4.047 × 3 = 12.14

3-6 Dividing Decimals by Whole Numbers

Example 1 Find each quotient

0.75÷ 5 = 0.15 2.52 ÷ 3 = 0.84

Example 2 Evaluate 0.435 ÷ *x* for *x* =3

0.435 ÷ 3 = 0.145, *etc*

3-7 Dividing by Decimals

Example 1 Find each quotient.

3.6 ÷ 1.2 = 3 42.3 ÷ 0.12 = 352.5

3-8 Problem Solving Skill: Interpret the Quotient

Example 1 Measurement Application

$0.87 \div 0.15 = ?$

$87 \div 15 = 5.8$

Note: The writer found that students had trouble dividing decimals by decimals. Great focuses were made on this part.

3-9 Solving Decimal Equations

Example 1 Solve each equation

$g - 3.1 = 4.5 \rightarrow g = 7.6$

$3k = 8.1 \rightarrow k = 2.7$

$\frac{m}{5} = 1.5 \rightarrow m = 7.5$

Chapter 4

Number Theory and Fractions

Chapter 4 dealt with number theory and fractions. There were10 sections including an extension section in it.

4-1 Divisibility

Vocabulary *divisible* *composite number* *prime number*

Note: The table in the book showed "Divisibility Rules" for numbers divisible by 2, 3, 4, 5, 6, 9,10.

4-2 Factors and Prime Factorization

Vocabulary *factor* *prime factorization*

Example 1 List factors of numbers

18

The factors of 18 are 1, 2, 3, 6, 9,18.

13

$13 = 1 \bullet 13$

The factor of 13 is 1 and 13.

Example 2 Write the prime factorization of each number.

36

The prime factorization of 36 is $2 \cdot 2 \cdot 3 \cdot 3$, or $2^2 \cdot 3^2$.

4-3 Greatest Common Factor

Example 1 Find the GCF

16 and 24

The GCF of 16 and 24 is 8.

Note: The section showed the three methods: listing factors, prime factorization, and a ladder diagram, to find GCF. These methods were very good.

4-4 Decimals and Fractions

Vocabulary *mixed numbers* *terminating decimal* *repeating decimal*

Example 1 Writing Decimal as Fractions or Mixed Numbers

$0.23 \rightarrow \frac{23}{100}$ $1.7 \rightarrow 1\frac{7}{10}$

Example 2 Writing Fractions as Decimals

$\frac{3}{4} = 0.75$ $5\frac{2}{3} = 5.666\ldots = 5.\overline{6}$

Example 3 Comparing and Ordering Fractions and Decimals

$0.5, \frac{1}{5}, 0.37 \rightarrow \frac{1}{5}, 0.37, 0.5$

4-5 Equivalent Fractions

Vocabulary *equivalent fractions* *simplest form*

Example 1 Finding Equivalent Fractions

$\frac{6}{8} = \frac{9}{12} = \frac{3}{4}$

Example 2 Multiplying and Dividing to Find Equivalent Fractions

$\frac{2}{3} = \frac{\quad}{18} \rightarrow \frac{2 \cdot 6}{3 \cdot 6} = \frac{12}{18}$

$\frac{70}{100} = \frac{7}{} \rightarrow \frac{70 \div 10}{100 \div 10} = \frac{7}{10}$

Example 3 Writing Fractions in Simplest Form

$\frac{18}{24} = \frac{18 \div 6}{24 \div 6} = \frac{3}{4}$

4-6 Mixed Numbers and Improper Fractions

Vocabulary *improper fraction* *proper fraction*

Example 2 Writing Mixed Numbers as Improper Fractions

$2\frac{1}{5} = \frac{(5 \cdot 2) + 1}{5} = \frac{10+1}{5} = \frac{11}{5}$

4-7 Comparing and Ordering Fractions

Vocabulary *like fractions* *unlike fractions* *common denominator*

Example 1 Compare, write <, > or =

Example 3 Ordering Fractions

Order $\frac{3}{7}$, $\frac{3}{4}$, and $\frac{1}{4}$ from least to greatest.

Rename with like denominators.

$$\frac{3 \cdot 4}{7 \cdot 4} = \frac{12}{28} \quad \frac{3 \cdot 7}{4 \cdot 7} = \frac{21}{28} \quad \frac{1 \cdot 7}{4 \cdot 7} = \frac{7}{28}$$

The fractions in order from least to greatest are $\frac{1}{4}$, $\frac{3}{7}$, $\frac{3}{4}$.

Note: The compilers should add to the section another way of how to compare fractions by using cross product.

4-8 Adding and Subtracting with Like Denominators

Example 2 Subtracting Like Fractions and Mixed Numbers

A) $1 - \frac{2}{3}$

$\frac{3}{3} - \frac{2}{3} = \frac{1}{3}$

B) $3\frac{7}{12} - 1\frac{1}{12} = 2\frac{6}{12} = 2\frac{1}{2}$

Example 3 Evaluating Expressions with Fractions

$\frac{5}{8} - x$ for $x = \frac{3}{8}$ → $\frac{5}{8} - \frac{3}{8} = \frac{2}{8} = \frac{1}{4}$

$x + 1\frac{1}{8}$ for $x = \frac{3}{8}$ → $\frac{3}{8} + 1\frac{1}{8} = 1\frac{1}{4}$

4-9 Estimating Fractions Sums and Differences

Example 1 Estimating Fractions

$\frac{8}{9} + \frac{2}{11} \rightarrow 1 + 0 = 1$

$\frac{7}{12} - \frac{8}{15} = \frac{1}{2} - \frac{1}{2} = 0$

Extension Sets of Numbers

Vocabulary *set* *empty set* *element* *subset* *intersection* *union* *Venn diagram*

Note: The Writer found that there were good examples describing numbers sets in the extension.

Chapter 5

Fraction Operations

Chapter 5 dealt with fraction operations. There were 10 sections in it.

5-1 Least Common Multiple

Vocabulary *least common multiple* (LCM)

Example 2 Using Multiples to find the LCM

6 and 9

The LCM of 6 and 9 is 18.

12, 10, and 15 → LCM: 60

Note: The writer found that there were good methods used to find LCM in the section such as using a *number line* and *prime factorization*. It was found that a ladder diagram was used to find *factors* and *prime factorization* in 4-2 and GCF in 4-3 of *Course 1*, but it was not found that the ladder diagram could be used in finding Least Common Multiple (LCM) in 5-1 of *Course 1*. Actually, the ladder diagram should be also used to find LCM if proper instruction was carried out.

5-2 Adding and subtracting with Unlike Denominators

Vocabulary *least common denominator* (LCD)

Example 2 Adding and Subtracting Unlike Fractions

$\frac{9}{10} - \frac{7}{8}$

$\frac{72}{80} - \frac{70}{80} = \frac{2}{80} = \frac{1}{40}$

$\frac{5}{12} + \frac{1}{6}$

$\frac{5}{12} + \frac{2}{12} = \frac{7}{12}$

Note: As mentioned in 5-1, the ladder diagram was also used to find LCD when adding and subtracting with unlike denominators if proper instruction was carried out.

5-3 Adding and subtracting Mixed Numbers

Example 1 Adding and Subtracting Mixed Numbers

$2\frac{3}{4} + 1\frac{1}{6}$

$2\frac{18}{24} + 1\frac{4}{24} = 3\frac{22}{24} = 3\frac{11}{12}$

$8\frac{2}{5} - 6\frac{3}{10}$

$8\frac{4}{10} - 6\frac{3}{10} = 2\frac{1}{10}$

Note: As mentioned in 5-1, the ladder diagram was also used to find LCD when adding and subtracting with unlike denominators if proper instruction was carried out.

5-4 Regrouping to Subtract Mixed Numbers

Example 1 Regrouping Mixed Numbers

$6\frac{5}{12} - 2\frac{7}{12}$

$5\frac{17}{12} - 2\frac{7}{12} = 3\frac{10}{12} = 3\frac{5}{6}$

$7\frac{2}{3} - 2\frac{5}{6}$

$7\frac{4}{6} = 6\frac{10}{6} - 2\frac{5}{6} = 4\frac{5}{6}$

Note: As mentioned in 5-1, the ladder diagram was also used to find LCD when adding and subtracting with unlike denominators if proper instruction was carried out.

5-5 Solving Fraction Equations: Addition and Subtraction

Example 1 Solving Equations by Addition and Subtracting

$x + 6\frac{2}{3} = 11$

$x = 11 - 6\frac{2}{3}$

$x = 4\frac{1}{3}$

$w - \frac{1}{2} = 2\frac{3}{4}$

$w = 2\frac{3}{4} + \frac{1}{2}$

$w = 2\frac{3}{4} + \frac{2}{4} = 2\frac{5}{4} = 3\frac{1}{4}$

5-6 Multiplying Fractions by Whole Numbers

Example 1 Multiplying fractions and Whole Numbers

$3 \bullet \frac{1}{9} = \frac{1}{9} + \frac{1}{9} + \frac{1}{9} = \frac{3}{9} = \frac{1}{3}$ $\qquad$ $4 \bullet \frac{7}{8} \rightarrow \frac{4}{1} \bullet \frac{7}{8} = \frac{28}{8} = \frac{7}{2}$ or $3\frac{1}{2}$

Example 2 Evaluating Fraction Expressions

$6x$ for $x = \frac{1}{8}$

$6 \bullet \frac{1}{8} = \frac{6}{8} = \frac{3}{4}$

5-7 Multiplying Fractions

Example 1 Multiplying Fractions

$\frac{1}{3} \bullet \frac{3}{5} = \frac{1}{5}$

Example 2 Evaluating Fraction Expressions

$a \bullet \frac{1}{3}$ for $a = \frac{5}{8}$

$\frac{5}{8} \bullet \frac{1}{3} = \frac{5}{24}$

5-8 Multiplying Mixed Numbers

Example 1 Multiplying Fractions and Mixed Numbers

$\frac{1}{3} \bullet 1\frac{1}{2}$

$\frac{1}{3} \bullet \frac{3}{2} = \frac{3}{6} = \frac{1}{2}$

Example 2 Multiplying Mixed Numbers

$2\frac{1}{2} \bullet 1\frac{1}{3}$

$\frac{5}{2} \bullet \frac{4}{3}$

$\frac{20}{6} = \frac{10}{3} = 3\frac{1}{3}$

5-9 Dividing Fractions and Mixed Numbers

Vocabulary *reciprocal*

Example 1 Finding Reciprocals

$\frac{1}{5} \bullet 5 = 1$ The reciprocal of $\frac{1}{5}$ is 5.

Example 2 Using Reciprocals to Divide Fractions and Mixed Numbers

$\frac{3}{4} \div \frac{1}{2} \rightarrow \frac{3}{4} \bullet \frac{2}{1} = \frac{6}{4} = \frac{3}{2} = 1\frac{1}{2}$

$2\frac{2}{3} \div 1\frac{1}{6} \rightarrow \frac{8}{3} \div \frac{7}{6} = \frac{8}{3} \bullet \frac{6}{7} = \frac{16}{7} = 2\frac{2}{7}$

5-10 Solving Fraction Equations: Multiplication and Division

Example 1 Solving Equations by Multiplying and Dividing

$\frac{2}{3}x = 14$

$\frac{2}{3}x \div \frac{2}{3} = 14 \div \frac{2}{3}$

$\frac{2}{3}x \bullet \frac{3}{2} = 14 \bullet \frac{3}{2}$

$x = \frac{42}{2}$, or 21

Chapter 6

Collecting and Displaying Data

Chapter 6 dealt with collecting and displaying data. There were 10 sections in it.

6-1 Problem solving Skill: Make a Table

Example 1 Weather Application

Example 2 Organizing Data in a Table

6-2 Mean, Median, Mode, and Range

Vocabulary *mean median mode range*

Example 1 Finding the Mean of a Data Set

Example 2 Finding the Mean, Median, Mode, and Range of a Data Set

6-3 Additional Data and Outliers

Vocabulary *outlier*

Example 2 Social Studies Application

Example 3 Describing a Data Set

6-4 Bar Graphs

Vocabulary *bar graph double-bar graph*

Example 1 Reading a Bar Graph

Example 2 Making a Bar Graph

6-5 Line Plots, Frequency Tables, and Histograms

Vocabulary *line plot frequency table histogram*

Example 1 Making a Tally Table

Example 2 Making a Line Plot

Example 3 Making a Frequency Table with Intervals

Example 4 Making a Histogram

6-6 Ordered Pairs

Vocabulary *coordinate grid* *ordered pair*

Example 1 Identifying Ordered Pairs

Name the ordered pair for each location.

For example, where is the library, school, etc.?

Example 2 Graphing Ordered Pairs

Q $(4\frac{1}{2}, 6)$ S(0,4)

Note: It was found that no four quadrants were introduced in the section. Only graphing ordered pairs and identifying ordered pairs were asked to do on a coordinate grid in Quadrant I. If students did not study it in an elementary school, this section was a good example. If they studied it in an elementary, it should not be re-taught here. It should be taught after the integers were introduced.

6-7 Line Graphs

Vocabulary *line graph* *double-line graph*

Example 1 Making a Line Graph

Example 2 Reading a Line Graph

Example 3 Making a Double-Line Graph

6-8 Misleading Graphs

Example 1 Misleading Bar Graphs

Example 2 Misleading Line Graphs

6-9 Stem-and-Leaf Plots

Vocabulary *stem-and-leaf plot*

Example 1 creating Stem-and-Leaf Plots

Example 2 Reading Stem-and-Leaf Plots

6-10 Choosing an Appropriate Display

Example 1 Choosing an Appropriate Data Display

Note: It was found that a table of *Common Uses of Data Displays* was made so that students could understand more how to choose an appropriate display. That was a good table.

Chapter 7

Proportional Relationships

Chapter 7 dealt with proportional relationships. There were 11 sections including an extension section in it.

7-1 Ratios and Rates

Vocabulary *ratio* *equivalent ratios* *rate* *unit rate*

Example 1 Writing Ratios

$\frac{5}{4}$ or 5 to 4 or 5 : 4

Example 2 Writing Equivalent Ratios

$\frac{4}{6} = \frac{2}{3}$ $\frac{4}{6} = \frac{8}{12}$

So $\frac{4}{6}$, $\frac{2}{3}$, and $\frac{8}{12}$ are equivalent ratios.

Divide both terms by the second term to find the unite rate.

$$\text{unit rate} = \frac{\$1.98}{2} = \frac{\$1.98 \div 2}{2 \div 2} = \frac{\$.99}{1}$$ \$0.99 for 1 liter

When the prices of two or more items are compared, the item with the lowest unit rate is the best deal.

7-2 Using Tables to Explore Equivalent Ratios and Rates

Example 1 Making a Table to Find Equivalent Ratios

7-3 Proportions

Vocabulary *proportion*

Example 1 Modeling Proportions

Example 2 Using Cross Products to Complete Proportions

Note: The use of proportion was very important in math. It was found that students may have difficulty solving problems with proportion. From the writer's point of view, more word problems of proportion should be added to this section.

7-4 Similar Figures

Vocabulary *corresponding sides* *corresponding angles* *similar*

Example 1 Finding Missing Measures in Similar Figures

The two triangles are similar.

Find the missing length x and the measure of $\angle A$.

$$\frac{8}{12} = \frac{6}{x}$$

Example 2 Problem Solving Application

Note: From the writer's point of view, this section was also very important to students. More word problems of proportions should be added to this section.

7-5 Indirect Measurement

Vocabulary *indirect measurement*

Example 1 Using Indirect Measurement

$$\frac{6}{h} = \frac{12}{228} \quad \rightarrow h = 114$$

The snowman was 114 feet tall.

Note: The sections of 7-3, 7-4, and 7-5 were related to each other. From the writer's point of view, more word problems of these sections should be added to the end of this section.

7-6 Scale Drawing and Maps

Vocabulary *scale drawing* *scale*

Example 1 Finding Actual Distances

Example 2 Astronomy Application

7-7 Percents

Vocabulary *percent*

Example 1 Modeling Percents

Example 2 Writing Percents as Fractions

$$40\% = \frac{40}{100}$$

Example 4 Writing Percents as Decimals

$$24\% = \frac{24}{100} = 0.24$$

7-8 Percents, Decimals, and Fractions

Example 1 Writing Decimals as Percents

$$0.3 = \frac{3}{10} = \frac{30}{100} = 30\%$$

Example 2 Writing Fractions as Percents

$$\frac{4}{5} = \frac{80}{100} = 80\%$$

$$\frac{3}{8} = 0.375 = 37.5\%$$

7-9 Percent Problems

Formula: $\frac{\%}{100} = \frac{\text{is}}{\text{of}}$

Example 3 Multiplying to Find a Percent of a Number

Find 20% of 150.

$0.20 \bullet 150 = 30$

So 30 is 20% of 150.

Note: More examples should be added.

7-10 Using Percents

Vocabulary *discount* *tip* *sales tax*

Example 1 Finding Discounts

Example 2 Finding Tips

Example 3 Finding Sales Tax

Extension Simple Interest

Vocabulary *interest* *principal* *simple interest*

Formula: $I = p \bullet r \bullet t$

Example 1 Finding Simple Interest

Chapter 8

Geometric Relationships

Chapter 8 dealt with geometric relationships. There were 11 sections in it.

8-1 Building Blocks of Geometry

Vocabulary *point line plane line segment ray*

Example 1 Identifying Points, Lines, and Planes

Example 2 Identifying Line Segments and Rays

8-2 Measuring and Classifying angles

Vocabulary *angle vertex acute angle right angle obtuse angle straight angle*

Example 1 Measuring an Angle with a Protractor

Example 2 Drawing an Angle with a Protractor

Example 3 Classifying Angles

8-3 Angle Relationships

Vocabulary *congruent vertical angle adjacent angle complementary angles supplementary angles*

Example 1 Identifying Types of Angle Pairs

Example 2 Identifying an Unknown Angle Measures

8-4 Classifying Lines

Vocabulary *parallel lines perpendicular lines skew lines*

Example 1 Classifying Pairs of Lines

8-5 Triangles

Vocabulary *acute triangle obtuse triangle right angle scalene triangle isosceles equilateral triangle triangle*

Example 2 Using Properties of Angles to Label Triangles

Example 3 Classifying Triangles by Lengths of sides

The perimeter of the isosceles triangle is 7.8 cm a + (3.8 + 2) = 7.8 a = 2cm

8-6 Quadrilaterals

Vocabulary *quadrilateral parallelogram rectangle rhombus square trapezoid*

Example 1 Naming Quadrilaterals

Example 2 Classifying Quadrilaterals

8-7 Polygons

Vocabulary *polygon regular polygon*

Example 1 Identifying Polygon

Example 2 Problem solving Application

Note: It was good to illustrate the each interior measure of a polygon, but it should tell students the formula: *(n-2) • 180*°.

8-8 Geometric Patterns

Example 1 Extending Geometric Patters

Example 2 Completing Geometrical Patterns

8-9 Congruence

Example 1 Identifying Congruent Figures

8-10 Transformations

Vocabulary *transformation translation rotation reflection line of reflection*

Example 1 Identifying Transformation

Example 2 Drawing Transformation

Note: It was found that no transformation is described in the coordinate plane, but it appeared on p. 463 (LAB).

8-11 Line Symmetry

Vocabulary *line symmetry line of symmetry*

Example 1 Identifying Lines of Symmetry

Example 2 Finding Multiple Lines of Symmetry

Chapter 9

Measurement and Geometry

Chapter 9 dealt with measurement and geometry. There were 8 sections in it.

9-1 Understanding Customary Units of Measure

Vocabulary *customary system*

Example 1 Choosing Appropriate Units of Length

Example 2 Choosing Appropriate Units of Weight

Example 3 Choosing Appropriate Unites of Capacity

Example 4 Finding Measurements

9-2 Understanding Metric Units of Measure

Vocabulary *metric system*

Example 1 Choosing Appropriate Units of Length

Example 2 Choosing Appropriate Units of Mass

Example 3 Choosing appropriate Units of Capacity

Example 4 Finding Measurements

9-3 Converting Customary Units

Example 1 Using a Conversion Factor

$93\ \cancel{\text{in.}} \times \frac{1\text{ ft}}{12\ \cancel{\text{in,}}}$ 93 in. = 7.75 ft $2\ \cancel{\text{lb}} \times \frac{16\text{ oz}}{1\ \cancel{\text{lb}}} = 32$ oz 2 lb = 32 oz

Example 2 Converting Units of Measure by Using Proportions

48 qt = ___ gal $\rightarrow \frac{4\text{qt}}{1\text{gal}} = \frac{48\text{qt}}{\text{x gal}} \rightarrow 4 \bullet x = 1 \bullet 48 \rightarrow 4x = 48 \rightarrow x = 12 \rightarrow$48q = 12 gal

9-4 Converting Metric Units

Example 2 Using Powers of Ten to Convert Metric Units of Measure

The width of a book is about 22 cm.

22cm = _ mm →22 cm = (22•10) mm → 22cm=220mm

Example 3 Converting Metric Units of Measure

11m = ___ cm → $11\cancel{\text{m}} \cdot \frac{100\text{cm}}{1\cancel{\text{m}}} = 1{,}100$ cm

9-5 Time and Temperature

Example 1 converting time

450 min = __ hr →$450\cancel{\text{min}} \cdot \frac{1\text{hr}}{60\cancel{\text{min}}} = \frac{450}{60}$ hr → 450 min = $7\frac{1}{2}$ hr

Example 2 Finding Elapsed Time

Example 3 Estimating Temperature

Formula: $F = \frac{9}{5}C + 32.$ $C = \frac{5}{9}(F - 32)$

20° C is about __ $°F$ → $F = \frac{9}{5} \cdot 20 + 32$ → F = 40 + 30 ≈ 70 $20°C \text{ is about } 70°F$

9-6 Finding Angle Measures in Polygons

Example 1 Subtracting to Find Angle Measures

Example 2 Estimating Angle Measures

9-7 Perimeter

Example 1 Finding the Perimeter of a Polygon

Example 2 Using a Formula to find Perimeter

A rectangle formula: $P = 2l + 2w$

Example 3 Finding Unknown Side Lengths and the Perimeter of a Polygon

9-8 Circles and Circumference

Vocabulary *circle center radius (radii) diameter circumference pi*

Example 1 Naming Parts of a Circle

Name the circle, a diameter, and radii.

Example 3 Using the Formula for the Circumference of a Circle

Chapter 10

Measurement: Area and Volume

Chapter 10 dealt with measurement regarding area and volume. There were 9 sections in it.

10-1 Estimating and Finding Area

Vocabulary *area*

Example 1 Estimating the Area of an Irregular Figure

Example 2 Finding the area of the rectangle

Example 3 Finding the Area of a Parallelogram

10-2 Area of Triangles and Trapezoids

Example1 Finding the Area of a Triangle

Example 3 Finding the Area of a Trapezoid

Note: From the writer's point of view, more word problems should be added to this section to find the height of a triangle if its area and base were given, or to find the base of a triangle if its area and height were given, because students already learned how to solve equations in Chapter 2 and some of Chapter 11 in *Course 1*.

10-3 Area of Composite Figures

Example 1 Finding Areas of Composite Figure

10-4 Comparing Perimeter and Area

Example 1 Changing Dimensions

When the dimensions of the rectangle are doubled, the perimeter is also doubled, and the area becomes four times as great.

Example 2 Measurement Application

When the dimensions of the rectangle are multiplied by 3, the perimeter is multiplied by 3, and the area is multiplied by 9, or 3^2.

10-5 Area of Circles

Example 1 Estimating the Area of a Circle

Example 2 Using the Formula for the Area of a Circle

Note: From the writer's point of view, more word problems should be added to this section to find the radius or diameter if the area was given or if the circumference was given, because students already studied the circumference in 9-8 of *Course 1*.

10-6 Three-Dimensional Figures

Vocabulary *polygon face edge vertex prism base pyramid cylinder cone*

Example 1 Identifying Faces, Edge, and vertices

Example 2 Naming Three-Dimensional Figures

10-7 Volume of Prisms

Example 1 Finding the Volume of a Rectangular Prism

Example 2 Finding the Volume of a Triangle Prism

10-8 Volume of Cylinders

Example 1 Finding the Volume of a Cylinder

Example 3 Comparing Volume of Cylinder

10-9 Surface Area

Vocabulary *surface area net*

Example 1 Finding the Surface Area of a Prism

Example 2 Finding the Surface Area of a Pyramid

Example 3 Finding the Surface Area of a Cylinder

Note: From the writer's point of view, more problems should be added in this chapter when students were asked to find the height or length of a certain figure if the area, the surface area, and the volume were given. That was most challenging to students.

Chapter 11

Integers, Graphs, and Functions

Chapter 11 dealt with graphs and functions. There were 11 sections including an extension section in it.

11-1 Integers in Real-World Situations

Vocabulary *positive number* *negative number* *opposites* *integers*

Example 1 Identifying Positive and Negative Numbers in the Real World

(i.e., a gain of 20 yard in football, spending $75, 10 feet below sea level

Example 2 Graphing Integers

(i.e., on the number lines)

Example 3 Writing Integer Expressions to Represent Situations

11-2 Comparing and Ordering Integers

Example 1 Comparing Integers

Use the number line to compare each pair of integers. Write < or >.

Example 2 Ordering Integers

Order the integers in each set from least to greatest

11-3 The Coordinate Plane

Vocabulary *coordinate plane* *axis* *x-axis* *y-axis* *quadrants* *origin*

coordinates *x-coordinate* *y-coordinate*

Example 1 Identifying Quadrants

Name the quadrant where each point is located.

Example 2 Locating Points on a Coordinate Plane

K From the origin, *k* is 1 unit right and 4 units up. → (1, 4), etc

Example 3 Graphing Points on a Coordinate Plane

P(-3, -2) R(0, 4) M(3, -4)

11-4 Adding Integers

Example 1 Writing Integers Addition

Write the addition modeled on each number line.

Example 2 Adding Integers

Example 3 Evaluating Integer Expressions

Evaluate $x + 3$ for $x = -9$. $\rightarrow -9 + 3 = -6$

11-5 Subtracting Integers

Example 1 Write the subtraction modeled on each number line.

$8 + (-10) = -2$ $2 - (-4) = 6$

Example 2 Subtracting Integers

$7 - 4 = 3$ $-8 - (-2) = -6$

Example 3 Evaluating Integer Expressions

$x - (-4)$ for $x = -5 \rightarrow -5 - (-4) = -1$

11-6 Multiplying Integers

Example 1 Multiplying Integers

$4 \cdot 3 = 12$ $2 \cdot (-4) = -8$ $-5 \cdot 2 = -10$ $-3 \cdot (-4) = 12$

Example 2 Evaluating Integer Expressions

Evaluate $5x$ for $x = -4 \rightarrow 5 \cdot (-4) = -20$

11-7 Dividing Integers

Example 1 Dividing Integer

$12 \div (-3) = -4$ $-15 \div (-3) = 5$

Example 2 Evaluating Integer Expressions

Evaluate $\frac{x}{3}$ for $x = -18 \rightarrow \frac{-18}{3} = -18 \div 3 = -6$

11-8 Solving Integers Equations

Example 1 Adding and Subtracting to solve Equations

$4 + x = -2$

$-4 + 4 + x = -2 - 4$

$x = -6$

$y - 6 = -5$

$y - 6 + 6 = -5 + 6$

$y = 1$

Example2 Multiplying and Dividing to Solve Equations

$-3a = 15$

$\frac{-3a}{-3} = \frac{15}{-3}$

$a = -5$

$\frac{b}{-4} = -2$

$-4 \cdot \frac{b}{-4} = -4 \cdot (-2)$

$b = 8$

11-9 Tables and Functions

Vocabulary *function* *input* *output*

Example 1 Writing Equations from Function Tables

x	3	4	5	6	7	10
y	7	9	11	12	15	?

y is 2 times x + 1 as shown from the above table. $y = 20 + 1 = 21$

Example 2 Translating Words into Math

The length of a rectangle is 5 times its width. $\rightarrow \ell = 5w$

Example 3 Problem Solving Application

11-10 Graphing Functions

Vocabulary *linear equation*

Example 1 Finding Solutions of Equations with Two Variables

Use the given x=values to write solutions of the equation y = 16x + 6 as ordered pairs.

x	16x +6	y
1	**16(1) +6**	**22**
2	**16(2) + 6**	**38**
3	**16(3) + 6**	**54**
4	**16(4) + 6**	**70**

Example 2 Determine whether the ordered pair is a solution to the given equation.

(8, 16) ; y = 2x → 16 = 2(8) → 16 = 16 So (8, 16) is a solution of y = 2x

Example 3 Reading Solutions on Graph

When x = 1, y = 3. The ordered pair is (1, 3)

Example 4 Graph the function described by the equation.

y = 2x + 1

Extension Integer Exponents

Example 1 Find a pattern in the table

Power	10^3	10^2	10^1	10^0	10^{-1}	10^{-2}
Value	1,000	100	10	0	$\frac{1}{10}$	$\frac{1}{100}$

One possible pattern is "divided by 10.

Example 2 Finding each value 2^0, 2^{-1}, 2^{-2}, 2^{-3}

Power	2^3	2^2	2^1	2^0	2^{-1}	2^{-2}	2^{-3}
Value	8	4	2	?	?	?	?

One possible pattern is "divided by 2."

$2^0 = 2 \div 2 = 1$ $2^{-1} = 1 \div 2 = \frac{1}{2}$ $2^{-2} = \frac{1}{2} \div 2 = \frac{1}{4}$ $2^{-3} = \frac{1}{4} \div 2 = \frac{1}{8}$

Look at the table in Example 2. There is another pattern.

$2^{-1} = \frac{1}{2}$ $2^{-2} = \frac{1}{2^2} = \frac{1}{4}$ $2^{-3} = \frac{1}{2^3} = \frac{1}{8}$

Note: This pattern worked for all negative exponents. It was found that there were a lot of good exercises for students to practice in this section.

Chapter 12

Probability

Chapter 12 dealt with probability. There were 7 sections including an extension section in it.

12-1 Introduction to Probability

Example 1 Estimating the Likelihood of an Event

Write *impossible, unlikely, as likely as not, likely*, or *certain* to describe each event.

Example 2 Writing Probabilities

35% = 0.35 or $\frac{35}{100} = \frac{7}{20}$ $0.6 = \frac{6}{10} = \frac{3}{5}$ 0.6 = 60% $\frac{9}{25} = 0.36 = 36\%$

Example 3 Comparing Probabilities

Compare: 50% > 25% Compare: 25% = 25%

12-2 Experimental Probability

Vocabulary *experiment* *outcome* *experimental probability*

Example 1 Identifying Outcomes

Formula: Experimental Probability

Probability $\approx \frac{\text{numner of times the event occurs}}{\text{total number of trial}}$

Example 2 Finding Experimental Probability

Example 3 Comparing Experimental Probabilities

Ian tossed a cone 30 times and recorded whether it landed on its base or on its side. Based on Ian's experiment, which way is the cone more likely to land?

Outcome	On its base	On its side
Frequency	~~1111~~ 11	~~1111~~ ~~1111~~ ~~1111~~ ~~1111~~ 111

$P(\text{base}) \approx \frac{\text{number of times the event occurs}}{\text{total number of trials}} = \frac{7}{30}$

$P(\text{side}) \approx \frac{\text{nuber of times the event occurs}}{\text{total number of trials}} = \frac{23}{30}$

$\frac{7}{30} < \frac{23}{30}$

It is more likely that the cone will land on its side.

12-3 Counting Methods and Sample Space

Vocabulary *sample space*

Example 1 Problem Solving Application

Example 2 Making an Organized List

Example 3 Using the Fundamental Counting Principal

There are 4 choices for fine arts classes and 6 choices for athletics classes.

4 • 6 = 24 Multiply the number of choices in each category. There are 24 possible combinations.

12-4 Theoretical Probability

Vocabulary *theoretical probability* *equally likely* *fair* *complement*

Formula: probability $= \frac{\text{number of ways the event can occur}}{\text{total number of equally likely outcomes}}$

Example 1 Finding Theoretical Probability

What is the probability that a fair coin will land heads up?

P(heads) $= \frac{\text{1 way event can occur}}{\text{2 possible outcomes}} = \frac{1}{2}$

What is the probability of rolling a number less than 5 on a fair number cube?

P(less than 5) $= \frac{\text{4 ways event can occur}}{\text{6 possible outcomes}} = \frac{4}{6} = \frac{2}{3}$

Example 2 Finding the Complement of an Event

Suppose there is a 10% chance of rain today. What is the probability that is will NOT rain?

P(rain) + P(not rain) = 100%

P(not rain) = 100% - 10%

P(not rain) = 90%

12-5 Compound Events

Vocabulary *compound event*

Example 1 Finding Probabilities of Compound Events

Find the probability that the number cube will show an odd number ***and*** that the coin will show tails.

$P(\text{odd, tails}) = \frac{\text{3 ways event can occur}}{\text{12 possible outcomes}} = \frac{3}{12} = \frac{1}{4}$

12-6 Making Predictions

Vocabulary *prediction* *population* *sample*

Example 1 Using Sample Surveys to Make Predictions

Example 2 Using Theoretical Probability to Make Predictions

If you roll a number cube 24 times, how many times do you expect to roll a 5?

$P(\text{rolling a 5}) = \frac{1}{6}$

$\frac{1}{6} = \frac{x}{24} \rightarrow x = 4$

You can expect to roll a 5 about 4 times.

Example 3 Problem Solving Application

Extension Independent and Dependent Events

Vocabulary *independent events* *dependent events*

Example 1 Finding the Probability of Independent Events

Finding the probability of rolling a 3 on a number cube and the spinner shown landing on A (A, B, C, D, E) $P(3 \text{ and } A) = P(3) \cdot P(A) = \frac{1}{6} \cdot \frac{1}{5} = \frac{1}{30}$

Example 2 Finding the Probability of Dependent Events

A bag contains 3 red marbles and 2 blue marbles. Find the probability of drawing a red marble and then a blue marble.

$P(\text{red and blue}) = P(\text{red} \cdot p(\text{blue after red})$

$P(\text{red}) = \frac{3}{5}$

$P(\text{blue after red}) = \frac{2}{4} = \frac{1}{2}$

$P(\text{red and blue}) = P(\text{red} \bullet p(\text{blue after red}) = \frac{3}{5} \bullet \frac{1}{2} = \frac{3}{10}$

The probability of drawing a red marble and then a blue marble is $\frac{3}{10}$.

C. Table 1B

Mathematics *Course 1*

Mathematics *Course 1* was analyzed. The following mini-tables were shown to see whether the contents of each chapter were overlapped or repeated in each grade (*Course 1*, *Course 2*, and *Course 3*). For example, when *1-3 Exponents* was shown in Mathematics *Course 1* below, it meant that the *1-3Exponents* section was also introduced or mentioned in 1-2 and 1-4 in Mathematics *Course 2* and in 4-1 in *Course 3* below. They were somewhat related each other.

Chapter 1 Whole Numbers and Patterns

Names of Text Books	Mathematics *Course 1*	Mathematics *Course 2*	Mathematics *Course 3*
Contents	1-3 Exponents	1-2 Exponents 1-4 Scientific Notation	4-1Exponents

Names of Text Books	Mathematics *Course 1*	Mathematics *Course 2*	Mathematics *Course 3*
Contents	1-4 Order of Operations	1-5 Order of Operations	p.6 & p.828

Names of Text Books	Mathematics *Course 1*	Mathematics *Course 2*	Mathematics *Course 3*
Contents	1-5 Mental Math	1-6 Properties	p.829

Names of Text Books	Mathematics *Course 1*	Mathematics *Course 2*	Mathematics *Course 3*
Contents	1-7 Patterns and Sequences	4-5 Problem Solving Skills: Find a Pattern in Sequences	3-6 Arithmetic Sequences 13-1 Terms of Arithmetic Sequences

Chapter 2 Introduction to Algebra

Names of Text Books	Mathematics *Course 1*	Mathematics *Course 2*	Mathematics *Course 3*
Contents	2-1 Variables and Expressions	1-7 Variables and Algebraic Expressions	1-1 Variables and Expressions 1-2 Algebraic Expressions

Names of Text Books	Mathematics *Course 1*	Mathematics *Course 2*	Mathematics *Course 3*
Contents	2-2 Problem Solving Skills: Translate Between Words and Math	1-8 Problem solving Skill: Translate Words into Words	1-2 Algebraic Expression p.63

Names of Text Books	Mathematics *Course 1*	Mathematics *Course 2*	Mathematics *Course 3*
Contents	2-3 Translating Between Tables and Expressions	4-5 Find a Pattern in Sequence	3-6 Arithmetic Sequences

Names of Text Books	Mathematics *Course 1*	Mathematics *Course 2*	Mathematics *Course 3*
Contents	2-4 Equations and Their Solutions	1-10 Equations and Their Solution	1-7 Solving Equations by Adding or Subtracting

Names of Text Books	Mathematics *Course 1*	Mathematics *Course 2*	Mathematics *Course 3*
Contents	2-5 Addition Equations	1-11 Addition and Subtraction Equation	1-7 Solving Equations by Adding or Subtracting

Names of Text Books	Mathematics *Course 1*	Mathematics *Course 2*	Mathematics *Course 3*
Contents	2-6 Subtraction Equations	1-11 Addition and Subtraction Equation	1-7 Solving Equations by Adding or Subtracting 2-6 Adding and Subtracting with Unlike Denominators 2-7 Solving Equations with Rational Numbers

Names of Text Books	Mathematics *Course 1*	Mathematics *Course 2*	Mathematics *Course 3*
Contents	2-7 Multiplication Equations	1-12 Multiplication and Division Equation	1-8 Solving Equations by Multiplying or Dividing

Names of Text Books	Mathematics *Course 1*	Mathematics *Course 2*	Mathematics *Course 3*
Contents	2-8 Division Equations	1-12 Multiplication and Division Equation	1-8 Solving Equations by Multiplying or Dividing

Names of Text Books	Mathematics *Course 1*	Mathematics *Course 2*	Mathematics *Course 3*
Contents	Extension Inequalities (on page 90)	12-4 Inequalities 12-5 Solving Inequalities by Adding or Subtracting 12-6 Solving Inequalities by Multiplying or Dividing 12-7 Solving Two-Step Inequalities	1-9 Introduction to inequalities

Chapter 3 Decimals

Names of Text Books	Mathematics *Course 1*	Mathematics *Course 2*	Mathematics *Course 3*
Contents	3-1 Representing, Comparing, and Ordering Decimals	2-11 Comparing and Ordering Rational Numbers	6-1Relating Decimals, Fractions and Percents

Names of Text Books	Mathematics *Course 1*	Mathematics *Course 2*	Mathematics *Course 3*
Contents	3-2 Estimating Decimals	3-1 Problem Solving Skills: Estimate with Decimals	P.820

Names of Text Books	Mathematics *Course 1*	Mathematics *Course 2*	Mathematics *Course 3*
Contents	3-3 Adding and Subtracting	3-2 Adding and Subtracting Decimals	2-3 Adding and Subtracting Rational Numbers

Names of Text Books	Mathematics *Course 1*	Mathematics *Course 2*	Mathematics *Course 3*
Contents	3-4 Scientific Notation	1-4 Applying Exponents	4-4 Scientific Notation

Names of Text Books	Mathematics *Course 1*	Mathematics *Course 2*	Mathematics *Course 3*
Contents	3-5 Multiplying Decimals	3-3 Multiplying Decimals	2-4 Multiplying Rational Numbers

Names of Text Books	Mathematics *Course 1*	Mathematics *Course 2*	Mathematics *Course 3*
Contents	3-6 Dividing Decimals by Whole Numbers	3-4 Dividing Decimals by Integers	2-5 Dividing Rational Numbers

Names of Text Books	Mathematics *Course 1*	Mathematics *Course 2*	Mathematics *Course 3*
Contents	3-7 Dividing Decimals	3-5 Dividing Decimals and Integers by Decimals	2-5 Dividing Rational Numbers

Names of Text Books	Mathematics *Course 1*	Mathematics *Course 2*	Mathematics *Course 3*
Contents	3-8 Problem Solving Skills: Interpret the Quotient	3-5 Dividing Decimals and Integers by Decimals	2-5 Dividing Rational Numbers p.825

Chapter 4 Number Theory and Fractions

Names of Text Books	Mathematics *Course 1*	Mathematics *Course 2*	Mathematics *Course 3*
Contents	4-1 Divisibility	2-6 Prime Factorization p.767	p.822 p.823

Names of Text Books	Mathematics *Course 1*	Mathematics *Course 2*	Mathematics *Course 3*
Contents	4-2 Factors and Prime Factorization	2-6 Prime Factorization	p.824

Names of Text Books	Mathematics *Course 1*	Mathematics *Course 2*	Mathematics *Course 3*
Contents	4-3 Greatest Common Factor	2-7 Greatest Common Factor	p.824

Names of Text Books	Mathematics *Course 1*	Mathematics *Course 2*	Mathematics *Course 3*
Contents	4-4 Decimals and Fractions	2-10 Equivalent Fractions and Decimals	6-1 Relating Decimals, Fractions and Percents

Names of Text Books	Mathematics *Course 1*	Mathematics *Course 2*	Mathematics *Course 3*
Contents	4-5 Equivalent Fractions	2-9 Equivalent Fractions and Mixed Numbers	5-1 Ratios and Proportions

Names of Text Books	Mathematics *Course 1*	Mathematics *Course 2*	Mathematics *Course 3*
Contents	4-6 Mixed Numbers and Improper Fractions	2-9 Equivalent Fractions and Mixed Numbers	p. 825

Names of Text Books	Mathematics *Course 1*	Mathematics *Course 2*	Mathematics *Course 3*
Contents	4-7 Comparing and Ordering Fractions	2-11 Comparing and Ordering Rational Numbers	2-2 Comparing and Ordering Rational Numbers 6-1 Relating Decimals, Fractions and Percents

Names of Text Books	Mathematics *Course 1*	Mathematics *Course 2*	Mathematics *Course 3*
Contents	4-8 Adding and Subtracting with Like Denominators	3-8 Adding and Subtracting Fractions	2-3 Adding and Subtracting Rational Numbers 2-6 Adding and Subtracting with Unlike Denominators

Names of Text Books	Mathematics *Course 1*	Mathematics *Course 2*	Mathematics *Course 3*
Contents	4-9 Estimating Fractions Sums and Differences	3-7 Problem Solving Skills: Estimate with Fractions 6-3 Problem Solving Skills: Estimate with Percents	6-2 Estimating with Percents

Chapter 5 Fractions Operations

Names of Text Books	Mathematics *Course 1*	Mathematics *Course 2*	Mathematics *Course 3*
Contents	5-1 Least Common Multiple	2-8 Least Common Multiples	2-2 Comparing and Ordering Rational Numbers

Names of Text Books	Mathematics *Course 1*	Mathematics *Course 2*	Mathematics *Course 3*
Contents	5-2 Adding and Subtracting with Unlike Denominators	3-8 Adding and Subtracting Fractions	2-6 Adding and Subtracting with Unlike Denominators

Names of Text Books	Mathematics *Course 1*	Mathematics *Course 2*	Mathematics *Course 3*
Contents	5-3 Adding and Subtracting Mixed Numbers	3-9 Adding and Subtracting Mixed Numbers	2-6 Adding and Subtracting with Unlike Denominators

Names of Text Books	Mathematics *Course 1*	Mathematics *Course 2*	Mathematics *Course 3*
Contents	5-4 Regrouping to Subtract Mixed Numbers	3-8 Adding and Subtracting Fraction	2-6 Adding and Subtracting with Unlike Denominators

Names of Text Books	Mathematics *Course 1*	Mathematics *Course 2*	Mathematics *Course 3*
Contents	5-5 Solving Fraction Equations: Addition and Subtraction	3-12 Solving Equations Containing Fractions	2-6 Adding and Subtracting with Unlike Denominators

Names of Text Books	Mathematics *Course 1*	Mathematics *Course 2*	Mathematics *Course 3*
Contents	5-6 Multiplying Fractions by Whole Numbers	3-10 Multiplying Fractions and Mixed Numbers	2-4 Multiplying Rational Numbers 2-5 Dividing Rational Numbers

Names of Text Books	Mathematics *Course 1*	Mathematics *Course 2*	Mathematics *Course 3*
Contents	5-7 Multiplying Mixed Numbers	3-10 Multiplying Fractions and Mixed Numbers	2-4 Multiplying Rational Numbers

Names of Text Books	Mathematics *Course 1*	Mathematics *Course 2*	Mathematics *Course 3*
Contents	5-8 Multiplying Mixed Numbers	3-10 Multiplying Fractions and Mixed Numbers	2-4 Multiplying Rational Numbers

Names of Text Books	Mathematics *Course 1*	Mathematics *Course 2*	Mathematics *Course 3*
Contents	5-9 Dividing Fractions and Mixed Numbers	3-11 Dividing Fractions and Mixed Numbers	2-5 Dividing Rational Numbers

Names of Text Books	Mathematics *Course 1*	Mathematics *Course 2*	Mathematics *Course 3*
Contents	5-10 Solving Fraction Equations: Multiplication and Division	3-12 Solving Equations Containing Fractions	2-7 Solving Equations with Rational Numbers

Chapter 6 Collecting and Displaying Data

Names of Text Books	Mathematics *Course 1*	Mathematics *Course 2*	Mathematics *Course 3*
Contents	6-1 Problem Solving Skills: Make a Table	From 7-1 to 7-6 showed how to make respective tables	p.815 p.816

Names of Text Books	Mathematics *Course 1*	Mathematics *Course 2*	Mathematics *Course 3*
Contents	6-2 Mean, Median, Mode, and Range	7-2 Mean, Median, Mode, and Range	9-3 Measures of Central Tendency

Names of Text Books	Mathematics *Course 1*	Mathematics *Course 2*	Mathematics *Course 3*
Contents	6-3 Additional Data and Outliers	7-2 Mean, Median, Mode, and Range	9-3 Measures of Central Tendency

Names of Text Books	Mathematics *Course 1*	Mathematics *Course 2*	Mathematics *Course 3*
Contents	6-4 Bar Graphs	7-3 Bar Graphs and Histograms	9-8 Choosing the Best Representation of Data

Names of Text Books	Mathematics *Course 1*	Mathematics *Course 2*	Mathematics *Course 3*
Contents	6-5 Line Plots, Frequency Tables, and Histograms	7-1 Frequency Tables, Stem-and-Leaf Plots, and Line Plots	9-2 Organizing data 9-8 Choosing the Best Representation of Data

Names of Text Books	Mathematics *Course 1*	Mathematics *Course 2*	Mathematics *Course 3*
Contents	6-6 Ordered Pairs	4-1 The Coordinate Plane 4-2 Table and Graphs	3-1 Ordered Pairs

Names of Text Books	Mathematics *Course 1*	Mathematics *Course 2*	Mathematics *Course 3*
Contents	6-7 Line Graphs	7-6 Line Graphs	9-5 Displaying Data

Names of Text Books	Mathematics *Course 1*	Mathematics *Course 2*	Mathematics *Course 3*
Contents	6-8 Misleading Graphs	7-10 Misleading Graphs	9-6 Misleading Graphing and Statistics

Names of Text Books	Mathematics *Course 1*	Mathematics *Course 2*	Mathematics *Course 3*
Contents	6-9 Stem-and-Leaf Plots	7-1 Frequency Tables, Stem-and-Leaf Plots, and Line Plots	9-2 Organizing Data

Names of Text Books	Mathematics *Course 1*	Mathematics *Course 2*	Mathematics *Course 3*
Contents	6-10 Choosing an Appropriate Display	7-7 Choosing an Appropriate Display	9-8 Choosing the Best Representation of Data

Chapter 7 Proportional Relationships

Names of Text Books	Mathematics *Course 1*	Mathematics *Course 2*	Mathematics *Course 3*
Contents	7-1 Ratios and Rates	5-1 Ratios 5-2 Rates	5-1 Ratios and Proportions 5-2 Ratios, Rates, and Unit Rates

Names of Text Books	Mathematics *Course 1*	Mathematics *Course 2*	Mathematics *Course 3*
Contents	7-2 Using Tables to Explore Equivalent Ratios and Rates	2-9 Equivalent Fractions and Mixed Numbers 5-1 Ratios	5-2 Ratios, Rates, and Unit Rates

Names of Text Books	Mathematics *Course 1*	Mathematics *Course 2*	Mathematics *Course 3*
Contents	7-3 Proportions	5-4 Identifying and Writing Proportions 5-5 Solving Proportions	5-4 Solving Proportions 5-7 Indirect Measurement

Names of Text Books	Mathematics *Course 1*	Mathematics *Course 2*	Mathematics *Course 3*
Contents	7-4 Similar Figures	5-7 Similar Figures and Proportions 5-8 Using Similar Figures	5-5 Similarity and Scale

Names of Text Books	Mathematics *Course 1*	Mathematics *Course 2*	Mathematics *Course 3*
Contents	7-5 Indirect Measurement	5-8 Using Similar Figures	5-7 Indirect Measurement

Names of Text Books	Mathematics *Course 1*	Mathematics *Course 2*	Mathematics *Course 3*
Contents	7-6 Scale Drawing and Maps	5-9 Scale Drawing and Scale Models	5-5 Similarity and Scale 5-8 Scale Drawings and Scale Models

Names of Text Books	Mathematics *Course 1*	Mathematics *Course 2*	Mathematics *Course 3*
Contents	7-7 Percents	6-1 Percents	6-1 Relating Decimals, Fractions, and Percents

Names of Text Books	Mathematics *Course 1*	Mathematics *Course 2*	Mathematics *Course 3*
Contents	7-8 Percents, Decimals, and Fractions	6-2 Fractions, Decimals, and Percents	6-1 Relating Decimals, Fractions, and Percents

Names of Text Books	Mathematics *Course 1*	Mathematics *Course 2*	Mathematics *Course 3*
Contents	7-9 Percent Problems	6-4 Percent of a Number 6-5 Solving Percent Problems	6-3 Finding Percents 6-4 Finding a Number when the Percent is Known

Names of Text Books	Mathematics *Course 1*	Mathematics *Course 2*	Mathematics *Course 3*
Contents	7-10 Using Percents	6-6 Percent of Change	6-5 Percent Increase and Decrease 6-6 Applications of Percents

Names of Text Books	Mathematics *Course 1*	Mathematics *Course 2*	Mathematics *Course 3*
Contents	Extension: Simple Interest	6-7 Simple Interest	6-7 Simple interest

Chapter 8 Geometric Relationships

Names of Text Books	Mathematics *Course 1*	Mathematics *Course 2*	Mathematics *Course 3*
Contents	8-1Building Blocks of Geometry	8-1 Building Blocks of Geometry	7-1 Points, Lines, Planes, and Angles

Names of Text Books	Mathematics *Course 1*	Mathematics *Course 2*	Mathematics *Course 3*
Contents	8-2 Measuring and Classifying Angles	8-2 Classifying Angles	7-3 Angles in Triangles

Names of Text Books	Mathematics *Course 1*	Mathematics *Course 2*	Mathematics *Course 3*
Contents	8-3 Angle Relationships	8-1 Building Blocks of Geometry 8-2 Classifying Angles	7-1 Points, Lines, Planes, and Angles

Names of Text Books	Mathematics *Course 1*	Mathematics *Course 2*	Mathematics *Course 3*
Contents	8-4 Classifying Lines	8-3 Angle Relationships	7-2 Parallel and Perpendicular Lines

Names of Text Books	Mathematics *Course 1*	Mathematics *Course 2*	Mathematics *Course 3*
Contents	8-5 Triangles	8-6 Classifying Triangles	7-3 Angles in Triangles 7-4 Classifying Polygons

Names of Text Books	Mathematics *Course 1*	Mathematics *Course 2*	Mathematics *Course 3*
Contents	8-6 Quadrilaterals	8-7 Classifying Quadrilaterals	7-4 Classifying Polygons

Names of Text Books	Mathematics *Course 1*	Mathematics *Course 2*	Mathematics *Course 3*
Contents	8-7 Polygons	8-5 Classifying Polygons	7-4 Classifying Polygons

Names of Text Books	Mathematics *Course 1*	Mathematics *Course 2*	Mathematics *Course 3*
Contents	8-8 Geometric Patterns	4-5 Problem Solving Skill: Find a Pattern in Sequence	13-3 Other Sequences

Names of Text Books	Mathematics *Course 1*	Mathematics *Course 2*	Mathematics *Course 3*
Contents	8-9 Congruence	8-9 Congruent Figures	7-6 Congruence

Names of Text Books	Mathematics *Course 1*	Mathematics *Course 2*	Mathematics *Course 3*
Contents	8-10 Transformations	8-10 Translations, Reflections, and Rotations	7-7 Transformation

Names of Text Books	Mathematics *Course 1*	Mathematics *Course 2*	Mathematics *Course 3*
Contents	8-11 Line Symmetry	8-11 Symmetry	7-8 Symmetry

Chapter 9 Measurement and Geometry

Names of Text Books	Mathematics *Course 1*	Mathematics *Course 2*	Mathematics *Course 3*
Contents	9-1 Understanding Customary Units of Measure	5-6 Customary Measurement	5-3 Dimensional Analysis p.843

Names of Text Books	Mathematics *Course 1*	Mathematics *Course 2*	Mathematics *Course 3*
Contents	9-2 Understanding Metric Units of Measure	1-3 Metric Measurements	p.831

Names of Text Books	Mathematics *Course 1*	Mathematics *Course 2*	Mathematics *Course 3*
Contents	9-3 Converting Customary Units	5-6 Customary Measurements Also: Extension Section of Chapter 5	5-3 Dimensional Analysis p.841

Names of Text Books	Mathematics *Course 1*	Mathematics *Course 2*	Mathematics *Course 3*
Contents	9-4Converting Metric Units	1-3 Metric Measurements	p.841

Names of Text Books	Mathematics *Course 1*	Mathematics *Course 2*	Mathematics *Course 3*
Contents	9-5 Time and Temperature	p. 685	p. 103 p. 842

Names of Text Books	Mathematics *Course 1*	Mathematics *Course 2*	Mathematics *Course 3*
Contents	9-6 Finding Angle Measures in Polygons	8-3 Angle Relationships	7-4 Classifying Polygons

Names of Text Books	Mathematics *Course 1*	Mathematics *Course 2*	Mathematics *Course 3*
Contents	9-7 Perimeter	9-2 Perimeter and Circumference	8-1 Perimeter and Area of Rectangles & Parallelograms

Names of Text Books	Mathematics *Course 1*	Mathematics *Course 2*	Mathematics *Course 3*
Contents	9-8 Circles and Circumference	8-4 Properties of Circles 9-2 Perimeter and Circumference	8-3 Circles

Chapter 10 Measurement: Area and Volume

Names of Text Books	Mathematics *Course 1*	Mathematics *Course 2*	Mathematics *Course 3*
Contents	10-1 Estimating the Area of an Irregular Figure	9-3 Area of Parallelograms	8-1 Perimeter and Area of Rectangles & Parallelograms

Names of Text Books	Mathematics *Course 1*	Mathematics *Course 2*	Mathematics *Course 3*
Contents	10-2 Area of Triangles and Trapezoids	9-4 Area of Triangles and Trapezoids	8-2 Perimeter and Area of Triangles and Trapezoids

Names of Text Books	Mathematics *Course 1*	Mathematics *Course 2*	Mathematics *Course 3*
Contents	10-3 Area of Composite Figures	9-6 Area of Irregular Figures	8-1 Perimeter and Area of Rectangles & Parallelograms

Names of Text Books	Mathematics *Course 1*	Mathematics *Course 2*	Mathematics *Course 3*
Contents	10- 5 Area of Circles	9-5 Area of Circles	8-3 Circles

Names of Text Books	Mathematics *Course 1*	Mathematics *Course 2*	Mathematics *Course 3*
Contents	10-6 Three-Dimensional Figures	10-1 Introduction to Three-Dimensional Figures	8-4 Drawing Three-Dimensional Figures

Names of Text Books	Mathematics *Course 1*	Mathematics *Course 2*	Mathematics *Course 3*
Contents	10-7 Volume of Prisms	10-2 Volume of Prism and Cylinder	8-5 Volume of Prisms and Cylinder

Names of Text Books	Mathematics *Course 1*	Mathematics *Course 2*	Mathematics *Course 3*
Contents	10-8 Volume of Cylinders	10-2 Volume of Prism and Cylinder	8-5 Volume of Prisms and Cylinder

Names of Text Books	Mathematics *Course 1*	Mathematics *Course 2*	Mathematics *Course 3*
Contents	10-9 Surface Area	10-4 Surface Area of Prism and Cylinders	8-7 Surface Area of Prisms and Cylinders

Chapter 11 Integers, Graphs, and Functions

Names of Text Books	Mathematics *Course 1*	Mathematics *Course 2*	Mathematics *Course 3*
Contents	11-1 Integers in Real-World Situation	2-1 Integers	1-3 Integers and Absolute Value

Names of Text Books	Mathematics *Course 1*	Mathematics *Course 2*	Mathematics *Course 3*
Contents	11-2 Comparing and Ordering Integers	2-1 Integers	1-3 Integers and Absolute Value

Names of Text Books	Mathematics *Course 1*	Mathematics *Course 2*	Mathematics *Course 3*
Contents	11-3 The Coordinate Plane	4-1 The Coordinate Plane	3-2 Graphing on a Coordinate Plane

Names of Text Books	Mathematics *Course 1*	Mathematics *Course 2*	Mathematics *Course 3*
Contents	11-4 Adding Integers	2-1 Integers	1-4 Adding Integers

Names of Text Books	Mathematics *Course 1*	Mathematics *Course 2*	Mathematics *Course 3*
Contents	11-5 Subtracting Integers	2-3 Subtracting Integers	1-5 Subtracting Integers

Names of Text Books	Mathematics *Course 1*	Mathematics *Course 2*	Mathematics *Course 3*
Contents	11-6 Multiplying Integers	2-4 Multiplying and Dividing Integers	1-6 Multiplying and Dividing Integers

Names of Text Books	Mathematics *Course 1*	Mathematics *Course 2*	Mathematics *Course 3*
Contents	11-7 Dividing Integers	2-4 Multiplying and Dividing Integers	1-6 Multiplying and Dividing Integers

Names of Text Books	Mathematics *Course 1*	Mathematics *Course 2*	Mathematics *Course 3*
Contents	11-8 Solving Integers Equations	2-5 Solving Equations Containing Integers	1-7 Solving Equations by Adding or Subtracting

Names of Text Books	Mathematics *Course 1*	Mathematics *Course 2*	Mathematics *Course 3*
Contents	11-9 Tables and Functions	4-2 Tables and Graphs 4-4 Functions, Tables, and Graphs	3-3 Interpreting Graphs and Tables 3-5 Equations, Tables, and Graphs

Names of Text Books	Mathematics *Course 1*	Mathematics *Course 2*	Mathematics *Course 3*
Contents	11-10 Graphing Functions	4-4 Functions, Tables, and Graphs 4-6 Graphing Linear Functions	3-1 Ordered Pairs

Chapter 12 Probability

Names of Text Books	Mathematics *Course 1*	Mathematics *Course 2*	Mathematics *Course 3*
Contents	12-1 Introduction to Probability	11-1 Probabilities	10-1 Probability

Names of Text Books	Mathematics *Course 1*	Mathematics *Course 2*	Mathematics *Course 3*
Contents	12-2 Experimental Probability	11-2 Experimental probability	10-2 Experimental Probability

Names of Text Books	Mathematics *Course 1*	Mathematics *Course 2*	Mathematics *Course 3*
Contents	12-3 Counting Methods and Sample Space	11-3 Problem Solving Skills: Make a List to Find Sample Space	10-8 Counting Principles

Names of Text Books	Mathematics *Course 1*	Mathematics *Course 2*	Mathematics *Course 3*
Contents	12-4 Theoretical Probability	11-4 Theoretical Probability	10-4 Theoretical Probability

Names of Text Books	Mathematics *Course 1*	Mathematics *Course 2*	Mathematics *Course 3*
Contents	12-5 Compound Events	11-5 Probability of Independent and Dependent Events	10-5 Independent and Dependent Events

Names of Text Books	Mathematics *Course 1*	Mathematics *Course 2*	Mathematics *Course 3*
Contents	12-6 Making Predictions	11-1 probability 11-3 Problem solving Skill: Make a List to Find Sample space	10-8 Counting Principles

Names of Text Books	Mathematics *Course 1*	Mathematics *Course 2*	Mathematics *Course 3*
Contents	Extension: Independent and Dependent Events (on page 700)	11-5 Probability of Independent and Dependent Events	10-5 Independent and Dependent Events

D. Mathematics *Course 2*

In *Course 2* Mathematics Textbook, there were 12 chapters which contained 112 sections including 7 extension sections. Mathematics *Course 2* had 841 pages long. Systematical analyses were made of every section in each chapter to find whether or not the contents were "a mile wide and an inch deep." Great details were also indicated in Table 2B on page 107. From Table 2B, many of contents were seen being repeated or overlapped in each grade. Some of typical examples of repletion or overlapping were stated in the following. The writer did not type all of the examples to show whether to be repeated or re-taught in the following statement. Table 2B was clearly shown which content was to be taught or to be re-taught, *etc*. It was found that about 20% of the contents were new.

As was shown in Table 2B, there were a great number of contents re-taught in *Course 2* and *Course 3*. *Exponents* in 1-2 in *Course 2*, for example, was again taught after it was taught in *Course 1* and continued being repeated in *Course 3*. The writer selected some examples from each course. Typical examples were stated as follows.

In *Course 2*:

1-2 Exponents

Example 1 Evaluating Powers

A) $5^2 = 5 \cdot 5 = 25$ C) $25^1 = 25$

Example 2 Expressing Whole Numbers as Powers

A) 49, base 7 $49 = 7 \cdot 7 = 7^2$

Students studied from 1-3 from *Course 1* how to deal with exponents. Why was it specifically indicated in this section?

In *Course 1*:

1-3 Exponents

Vocabulary *exponent base exponential form*

Example 1 Writing Numbers in Exponential Form

$4\times4\times4 \rightarrow 4^3$

Example 2 Finding the Value of Numbers in Exponential form

$2^7 \rightarrow 2\times2\times2\times2\times2\times2\times2 = 128$

Example 3 PROBLEM SOVLING APPLICATION

In *Course 3*:

4-1 Exponents

Vocabulary *exponential form exponent base power*

Example 1 Writing Exponents

A) $5 \cdot 5 \cdot 5 \cdot 5 \cdot 5 \cdot 5 \cdot 5 = 5^7$

B) $(-4) \cdot (-4) \cdot (-4) = (-4)^3$

C) $8 \cdot 8 \cdot 8 \cdot 8 \cdot p \cdot p \cdot p = 8^4p^3$

Example 2 Evaluating Power

A) 3^4 B) 12^2 C) $(-8)^3$ D) -2^3

Example 3 Using the Order of Operations

Evaluate $x - y(z \cdot y^z)$ for x = 20, y = 4, and z = 2

Example 4 Geometry Application

The number of diagonal of a n-sided figure is $\frac{1}{2}(n^2 - 3n)$. Use the formula to find the number of diagonals for a 6-sided figure.

$\frac{1}{2}(n^2 - 3n) \rightarrow \frac{1}{2}(6^2 - 3 \cdot 6) \rightarrow \frac{1}{2}(36 - 18) = 9$

The writer thought that students studied *Exponents and Their Solutions* in one chapter after they studied negative numbers. It was not necessary to let students study it here and there without mastering it.

Order of "Operation should have been taught in 4th and 5th grade. Students were supposed to have mastered the order of operations. However, *Order of Operations* was re-taught in *Course 1*, *Course 2*, and in *Course 3*. Some examples were stated as follows:

In *Course 2*:

1-5 Order Operations

Example 1 Using the Order of Operations

Simplify each expression.

A) $27\text{-}18 \div 6$

$27 - 3 = 24$

B) $36 - 18 \div 2 \cdot 3 + 8$

$36 - 9 \cdot 3 + 8$

$36 - 27 + 8$

$9 + 8 = 17$

C) $5 + 6^2 \cdot 10$

$5 + 36 \cdot 10$

$5 + 360 = 365$

Example 2 Using the Order of Operations with Grouping Symbols

A) $36 – (2 \cdot 6) \div 3$

$36 – 12 \div 3$

$36 – 4 = 32$

B) $[(4 + 12 \div 4) - 2]^3$

$[(4 + 3) -2]^3$

$[7 - 2]^3$

$5^3 = 125$

Students studied order of operations in 1-4 in *Course 1*. Why was it again stated here? Since they learned it from previous grades, exponent and the performance of the operation in parentheses were to be added.

In *Course 1*:

1-8 Order of Operations

Vocabulary *numerical expression evaluate order of operations*

Example 1 Using the Order of Operations

$9 + 12 \times 2 \rightarrow 9 + 24 = 33,\ 7 + (12 \times 3) \div 6 \rightarrow 7 + 36 \div 6 \rightarrow 7 + 6 = 13$

Example 2 Using the Order of Operations with Exponents

$3^3 + 8 - 16 \rightarrow 27 + 8 - 16 \rightarrow 35 - 16 = 19$

Example 3 Consumer Application

In *Course 3*, there was no specific section to be illustrated regarding *Order of Operations* in *Course 3*, but it was mentioned in 1-1 section and in *Skills Bank* on Page 828. The writer thought that basic *Order of Operations* was taught in elementary schools. Students should know what to do with order of operations. It was not necessary to have specific sections or chapters to re-teach *order of operations*. The details of order of operations in middle school should be revisited or reviewed in one chapter and then revisited in their-already-taught sections.

Variable and Algebraic Expressions was taught in *Course 1*, *Course 2*, and *Course 3*, respectively. Some examples were stated as follows:

In *Course 2*:

1-7 Variables and Algebraic Expressions

Vocabulary *variable constant algebraic expression evaluate*

Example 1 Evaluating Algebraic Expressions

Evaluate n + 7 for each value of n.

A) n = 3 n + 7 3 + 7 = 10

Example 2 Evaluating Algebraic Expressions Involving Order of Operations

A) $3x - 2$ for $x = 5$ $3(5) - 2$ $15 - 2 = 13$

B) $n \div 2 + n$ for n = 4 $4 \div 2 + 4$ $2 + 4 = 6$

C) $6y^2 + 2y$ for $y = 2$ $6(2)^2 - 2(2)$ $6(4) + 2(2)$ $24 + 4 = 28$

Example 3 Evaluate $\frac{3}{n} + 2m$ for n = 3 and m = 4. $\frac{3}{3} + 2(4)$ $1 + 8 = 9$

In *Course 1*:

2-1 Variables and Expressions

Vocabulary *variable constant algebraic expression*

Example 1 Evaluating Algebraic Expressions

w ÷ 3 when w = 55, 4 × n + 6^2

Example 2 Evaluating Expressions with Two Variables

$l \times w$ for $l = 4$ and $w = 2$

In *Course 3*:

1-1 Variables and Expressions

Vocabulary *variable coefficient algebraic expression constant evaluate substitute*

Example 1 Evaluating Algebraic Expressions with One Variable

A) x + 5 for x = 11

B) 2a + 3 for a = 4

C) 4(3 + n) -2 for n = 0, 1, 2

Example 2 Evaluating Algebraic Expressions with Two Variables

A) 5x + 2y for x = 13 and y = 11

B) 2.5p – 4q for p 12 and q = 6.5

This section was introduced in 2-1 of *Course 1* and 1-7 of *Course 2* and 1-1 of *Course 3*. Unfortunately, it was found that negative integers were not introduced. The book was intended

for 8th graders who already learned integers. Why did the compilers not make examples with negative integers in 1-1 of *Course 3*? *Variables and Expressions* should be taught in one chapter and then revisited later.

Equations and Their Solution was taught in Chapter 2 of *Course 1*, Chapter 1 of *Course 2*, and Chapter 1 of *Course 3*, respectively, the contents of which were repeated. Comparing and Ordering Decimals, Fractions, and Percents were re-taught in each course. From Table 1B, Table 2B, and Table 3B, repletion of certain contents were noted in mini-tables from each course.

E. Table 2A

(Mathematics *Course 2*)

Table 2A showed Mathematics *Course 2* Textbook, where there were 12 chapters which contained 112 sections including7 extension sections. Mathematics *Course 2* had 841 pages long. Additional comments were also made on some sections or chapters after the contents were studied. The writer gave a *note* at the end of certain sections in a chapter.

Chapter 1

Algebraic Reasoning

Chapter 1 dealt with algebraic reasoning that contained 12 sections. For example:

1-1 Numbers and Patterns

Example 1 Identify a possible pattern. Use the pattern to write the next three numbers.

Example 2 Identify a possible pattern. Use the pattern to draw the next three figures.

Example 3 Using Table to identify and Extend Patterns

Note: The examples showed students how to find a pattern. The contents of 1-1 section above were also studied in 1-7 in *Course 1*. Since students learned how to find arithmetic sequence, they should further study geometric sequence in this section. Unfortunately it was stated in 4-5 of *Course 2*.

1-2 Exponents

Vocabulary *Power exponent base*

Example 1 Evaluating Powers

A) $5^2 = 5 \cdot 5 = 25$ C) $25^1 = 25$

B)

Example 2 Expressing Whole Numbers as Powers

A) 49, base 7 $49 = 7 \cdot 7 = 7^2$

Note: Students learned *exponents* from 1-3 from *Course 1* how to deal with exponents. Why was it again specifically indicated in this section?

1-3 Metric Measurements

Example 1 Choosing the Appropriate Metric Unit

Example 2 Converting Metric Units

Example 3 Using Unit Conversion to Make Comparison

Note: All examples above showed students how to choose or convert metric units. The same contents were also studied in 9-2, 9-3, and 9-4 in *Course 1*. If students learned it from previous grade, why was it again specifically indicated in the section?

1-4 Applying Exponents

Vocabulary *scientific notation*

Example 1 Multiplying by Power of Ten

Example 2 Write 9,580,000 in scientific notation

Example 3 Writing Numbers in Standard Form

Example 4 Comparing Numbers in Scientific Notation

Note: All examples above showed students how to write scientific notation. Actually students learned it from 1-3 and 3-4 in *Course 1*. Since students studied it from previous grade or before, why was it specifically indicated here again? Negative exponents should be stated in this section rather than being stated in Extension (on page 134), Chapter 2 in *Course 2*.

1-5 Order Operations

Vocabulary *numerical expression* *order of operations*

Example 1 Using the Order of Operations

Simplify each expression.

D) $27-18 \div 6$
$27 - 3 = 24$

E) $36 - 18 \div 2 \cdot 3 + 8$
$36 - 9 \cdot 3 + 8$
$36 - 27 + 8$
$9 + 8 = 17$

F) $5 + 6^2 \cdot 10$

$5 + 36 \cdot 10$
$5 + 360 = 365$

Example 2 Using the Order of Operations with Grouping Symbols

C) $36 – (2 \cdot 6) \div 3$
$36 – 12 \div 3$
$36 – 4 = 32$
D) $[(4 + 12 \div 4) - 2]^3$
$[(4 + 3) -2]^3$
$[7 - 2]^3$
$5^3 = 125$

Note: Students learned order of operations in 1-4 in *Course 1*. Why was it again stated here? Since they learned it from previous grades, exponent and the performance of the operation in parentheses should be added. Unfortunately, no contents of such examples were stated in this section.

1-6 Properties

Vocabulary *Commutative Property Associated Property Identity Property Distributive Property*

Example 1 Identifying Properties of Addition and Multiplication

Example 2 Using Properties to Simplify Expressions

Example 3 Using the distributive Property to Multiply Mentally

Note: Students learned it from previous grades, they were supposed to know how to identify and use these properties. Most of the contents were studied in 1-5 in Course1. The only new contents were added of order of variables and identity property in this section.

1-7 Variables and Algebraic Expressions

Vocabulary *variable constant algebraic expression evaluate*

Example 1 Evaluating Algebraic Expressions

Evaluate $n + 7$ for each value of n.

B) $n = 3$ $n + 7$ $3 + 7 = 10$

Example 2 Evaluating Algebraic Expressions Involving Order of Operations

D) $3x – 2$ for $x = 5$ $3(5) – 2$ $15 – 2 = 13$
E) $n \div 2 + n$ for $n = 4$ $4 \div 2 + 4$ $2 + 4 = 6$

F) $6y^2 + 2y$ for $y = 2$ $6(2)^2 - 2(2)$ $6(4) + 2(4)$ $24 + 4 = 28$

Example 3 Evaluate $\frac{3}{n} + 2m$ for n = 3 and m = 4. $\frac{3}{3} + 2(4)$ $1 + 8 = 9$

Note: Students learned variables and algebraic expressions in 2-1 of *Course 1* before. Since students learned integers in Chapter 11, *Course 1*, why weren't there any examples involved in using integers(positive numbers and negative numbers) in algebraic expressions?

1-8 Translate Words into Math

Example 1 Translating Verbal Expressions into Algebraic Expressions

Example 2 Translating Real-World Problems into Algebraic Expression

Note: Students learned the translation of words into math from previous grades in 2-2, *Course 1*. In this section, there is a table for the translation of words into math. This would help students review what they studied from previous grades. That was a wonderful revisit and a good table.

1-9 Simplifying Algebraic Expressions

Vocabulary *term* *coefficient*

Example 1 Identifying Like Terms

Example 2 Simplifying Algebraic Expressions

Example 3 Geometry Application

Note: Students were taught how to simplify algebraic expressions. 1-9 section was a new section to students because students did not study how to combine like terms. Since this was a new section, examples of using integers should be explained. Unfortunately, no examples were indicated in this section. Students learned integers. They should know how to combine such terms as $3x^2 - 7x^2 + 6x - 8x - 10 - (-18) - 8x^0$, *etc*., if proper instruction was conducted.

1-10 Equations and Their Solutions

Vocabulary *equation* *solution*

Example 1 Determine whether the given value of the variable is a solution.

Example 2 Writing an Equation to Determine Whether a Number is a Solution

Example 3 Deriving a Real-World Situation from an Equation

Note: Students already learned how to solve equations and determine their solutions from previous grades in 2-4, *Course 1*.

1-11 Addition and Subtraction Equations

Vocabulary *Addition Property of Equality* *Inverse Operations* *Subtraction Property of Equality*

Example 1 Solving an Equation by Addition

$x - 8 = 17 \rightarrow x - 8 + 8 = 17 + 8 \quad x = 25$

Example 2 Solving an Equation by subtraction

$a + 5 = 11 \rightarrow a + 5 - 5 = 11 - 5 \quad a = 6$

Note: Students already learned addition and subtraction equations from 2-5 and 2-6 in *Course 1*.

1-12 Multiplication and Division Equation

Vocabulary *Multiplication Property of Equality* *Division Property of Equality*

Example 1 Solving an Equation by Multiplication

$\frac{x}{7} = 20 \rightarrow (7)\frac{x}{7} = 20\ (7) \rightarrow x = 140$

Example 2 Solving an Equation by division

$240 = 4z \rightarrow \frac{240}{4} = \frac{4z}{4} \rightarrow z = 60$ (Note: No integer involved above.)

Note: Students already learned multiplication and division equation from 2-7 and 2-8 in *Course 1*. Since students learned the four operations of integers in Chapter 11, *Course 1*, why shouldn't there be examples containing negative variables in this section? Students should know how to solve the following problems if proper instruction was conducted. For example:

$-x + 2 = -7$ $-3y - 4 = 20$, *etc*.

Chapter 2

Integers and Rational Numbers

Chapter 2 dealt with integers and rational numbers. It contained 12 sections including an extension section.

2-1 Integers

Example 1 Graphing Integers and Their Opposite on a Number Line

Graph the integers – 3 and its opposite on a number line.

Example 2 Comparing Integers Using a Number Line

Compare the integers. Use < or >.

Example 3 Ordering Integers Using a Number Line

Use a number line to order the integers -2, 5, 1, -1, and 0 from least to great.

Example 4 Finding Absolute Value

Use a number line to find each absolute value. |7| | -4|

Note: The contents of 2-1 were also indicated in11-1 and 11-2 in Chapter 11 in *Course 1*. The only new knowledge – finding absolute value – was added in here. Students already learned integers in Chapter 11 in *Course 1*. The contents of from 2-1 to 2-5 of Chapter 2 were also indicated in Chapter 11 in *Course 1*. 90% of the contents of Chapter 2 were duplicated here.

2-2 Adding Integers

Example 1 Modeling Integer Addition

Using a number line to find each sum -3 + (-6) 4 + (-7)

Example 2 Adding Integers Using Absolute Value

Find each sum. -7 + (-4) -8 + 6

Example 3 Evaluate Expressions with Integers

Evaluate $a + b$ for $a = 6$ and $b = -10$

Note: This section was also studied in 11-4 in *Course 1*.

2-3 Subtracting Integers

Example 1 Modeling Integer subtraction

Use a number line to find each difference.

A) 3- 8 B) -4 -2 C) 2 – (-3)

Example 2 Subtracting Integers by Adding the Opposite

Find each difference

A) 5 – 9 B) -9 – (-2) C) – 4 – 3

Example 3 Evaluating Expressions with Integers

Evaluate a – b for each set of values

A) a = - 6, b = 7 B) a = 14, b = -9

Note: This section was also studied in 11- 5 in *Course 1*.

2-4 Multiplying and Dividing Integers

Example 1 Multiplying Integers Using Repeated Addition

Use a number line to find each product.

A) 3 ·(-3) B) -4 · 2

Example 2 Multiplying Integers

A) – 4 · (-2) B) -3 · 6

Example 3 Dividing Integers

Find each quotient.

A) 72 ÷ (-9) B) -144 ÷ 12 C) -100 ÷ (-5)

Note: This section was also studied in 11-6 and 11-7 in *Course 1*.

2-5 Solving Equations Containing Integers

Example 1 Solving Addition and Subtraction Equations

Solve each equation.

A) – 3 + y = -5 B) n + 3 = -10 C) x – 8 = -32

Example 2 Solving Multiplication and Division Equations

A) $\frac{a}{-3} = 9$ B) -120 = 6x

Note: This section was also studied in 11-8 in *Course 1*. Unfortunately, no examples of negative variables were involved. Students already learned how to perform the four operations of integers. They should know how to solve such problems if proper instruction was conducted.

2-6 Prime Factorization

Example 1 Identifying Prime and Composite Numbers

Tell whether each number is prime or composite

A) 19 B) 20

Example 2 Using a Factor Tree to Find Prime Factorization

Write the prime factorization of each number

A) 36 B) 280

Example 3 Using a Step Diagram to Find Prime Factorization

Write the prime factorization of each number.

A) 252 B) 495

Note: Students already learned how to find prime numbers, composite numbers, and prime factorization in 4-1 and 4-2 in *Course 1*.

2-7 Greatest Common Factor

Example 1 Using a List to Find the GCF

Find the greatest common factor (GCF) of 24, 36, and 48

Example 2 Using Prime Factorization to Find the GCF

Find the greatest common factor (GCF)

A) 6, 45 B) 504, 132, 96, 60

Note: Students already learned how to find GCF because they learned it in 4-3, *Course 1*.

2-8 Least Common Multiple

Vocabulary *multiple least common multiple (*LCM*)*

Example 1 Using a List to Find the LCM

A) 3, 5 B) 4, 6, 12

Example 2 Using Prime Factorization to Find the LCM

Find the least common multiple (LCM)

A) 78, 110 B) 9, 27, 4

Note: Students already learned how to find LCM in 5-1, *Course 1*.

2-9 Equivalent Fractions and Mixed Numbers

Example 1 Finding Equivalent Fractions

Find two fractions equivalent to $\frac{14}{16}$.

Example 2 Writing Fractions in Simplest Form

Write the fraction $\frac{24}{36}$.

Example 3 Determine Whether Fractions Are Equivalent.

Example 4 Converting Between Improper Fractions and Mixed Numbers

Write $\frac{21}{4}$ as a mixed number. B) Write $4\frac{2}{3}$ as an improper fraction.

Note: Students learned how to find equivalent fractions, how to reduce fractions to the simplest form, and how to change improper fraction into mixed numbers because they learned them in 4-5 and 4-6 in *Course 1*.

2-10 Equivalent Fractions and Decimals

Example 1 Writing Fractions as Decimals

A) $\frac{3}{4}$ B) $\frac{6}{5}$ C) $\frac{1}{3}$

Example 2 Using Mental Math to Write Fractions as Decimals

$\frac{2}{5} \times \frac{2}{2} = \frac{4}{10} = 0.4$

Example 3 Writing Decimals as Fractions

Write each decimal as a fraction in simplest form.

A) 0.036 B) 1.28

Note: Students learned how to write fractions as decimals and vice versa in 4-4 in *Course 1*.

2-11 Comparing and Ordering Rational Numbers

Example 1 Comparing Fractions

Compare the fractions. Write < or >

A) $\frac{5}{6}$ ___ $\frac{7}{10}$ B) $-\frac{3}{5}$ _____ $-\frac{5}{9}$

Example 2 Comparing Decimals

Compare the decimals. Write < or >.

A) 0.81 ___ 0.84 B) $0.\overline{34}$ __ 0.342

Example 3 Ordering Fractions and Decimals

Order $\frac{3}{5}$, $0.\overline{77}$, - 0.1, and $1\frac{1}{5}$ from least to greatest.

Note: Students learned how to compare and order rational numbers in 3-1 in *Course 1*. In this section negative numbers were added as compared with 3-2 in *Course 1*.

Extension Negative Exponents

Example 1 Evaluate Negative Exponents

Evaluate 10^{-4}. $10^{-4} = \frac{1}{10^4} = \frac{1}{10{,}000} = 0.0001$

Example 2 Writing Small Numbers in Scientific Notation

Writing 0.000065 in scientific notation.

$0.000065 = 6.5 \times 10^{-5}$

Example 3 Writing small Numbers in Standard Forms

Write 3.4×10^{-6} in standard form. $3.4 \times 10^{-6} = 0.0000034$

Example 4 Comparing Numbers Using Scientific Notation

Compare. Write <, >, or =.

A) 3.7×10^{-8} ___ 6.1×10^{-12}

Note: The extension should be combined with 1-4 of *Course 2* rather than being stated here isolatedly. They should be put together.

Chapter 3

Applying Rational Numbers

Chapter 3, containing 12 sections in it, dealt with application of rational numbers.

3-1 Problem Solving Skills: Estimate with Decimals

Example 1 Estimating Sums and Differences of Decimals

Estimate by rounding to the nearest integer.

A) $86.9 + 58.4 \rightarrow 87 + 58 = 145$
B) $10.38 - 6.721 \rightarrow 10 - 7 = 3$

Example 2 Estimating Products and Quotients of Decimals

Use compatible numbers to estimate

A) $32.66 \bullet 7.69 \rightarrow 30 \times 8 = 240$
B) $36.5 \div (-8.241) \rightarrow 36 \div (-9) = -4$

Note: The section was also stated in 3-2 in *Course 1*.

3-2 Adding and Subtracting Decimals

Example 1 Adding Decimals

Add. Estimate to check whether each answer is reasonable.

Example 2 Subtracting Decimals

Note: The section was also stated in 3-3 in *Course 1*.

3-3 Multiplying Decimals

Example 1 Multiplying Integers by Decimals

Example 2 Multiplying Decimals by Decimals

Note: The section was also stated in 3-5 in *Course 1*, but the only new thing was added about negative numbers were introduced.

3-4 diving Decimals by Integers

Example 1 Dividing Decimals by integers

Note: This section was also stated in 3-3, 3-6, and 3-7 in *Course 1*. Negative numbers were added to the section.

3-5 Dividing Decimals and Integers by Decimals

Example 1 Dividing Decimals by Decimals

Divide

A) $4.32 \div 3.6$ B) $12.95 \div (-1.25)$

Example 2 Dividing Integers by Decimals

Divide. Estimate to check whether each answer is reasonable.

A) $9 \div 1.25$ B) $-12 \div (-1.6)$

Note: This section was also stated in 3-7 in *Course 1* with negative numbers added to it.

3-6 Solving Equations Containing Decimals

Example 1 Solving Equations by Adding or Subtracting

A) $S - 3.84 = 7.2$ B) $y + 20.51 = 26$

Example 2 Solving Equations by Multiplying or Dividing

A) $\frac{w}{3.9} = 1.2\,l$ B) $4 = 1.6c$

Note: This section was also stated in 3-9 in *Course 1*

3-7 Problem solving Skill: Estimate with Fractions

Example 1 Measurement Application

Example 2 Estimating Sums and Differences

Example 3 Estimating Products and Quotients

Note: This section was also introduced in 4-9 in *Course 1*.

3-8 Adding and Subtracting Factions

Example 1 Adding and Subtracting Fractions with Like Denominators

Example 2 Adding and Subtracting Fractions with Unlike Denominators

Note: This section was also introduced in 4-8 and 5-2 respectively with negative numbers added to them.

3-9 adding and Subtracting Mixed Numbers

Example 1 Measurement Application

Example 2 Adding Mixed Numbers

Example 3 Subtracting Mixed Numbers

Note: This section was also stated in 5-3 in *Course 1*, but no negative fractions were introduced. They should be included in this section.

3-10 Multiplying Fractions and Mixed Numbers

Example 2 Multiplying Fractions

Example 3 Multiplying Mixed Numbers

Note: This section was also stated in 5-8 in *Course 1*, but negative fractions were added to it.

3-11 Dividing Fractions and Mixed Numbers

Vocabulary *reciprocal*

Example 1 Dividing Fractions

Example 2 dividing Mixed Numbers

Note: This section was also stated in 5-9 in *Course 1*, but no negative fractions were introduced in this section. That was not consistent with the sections above.

3-12 Solving Equations Containing Fractions

Example 1 Solving Equations by Adding or Subtracting

A) $x - \frac{1}{5} = \frac{3}{5}$ B) $\frac{5}{12} + y = \frac{2}{3}$ C) $\frac{7}{18} + u = -\frac{14}{27}$

Example 2 Solving Equations by Multiplying

A) $\frac{2}{3}x = \frac{4}{5}$ B) $3y = \frac{6}{7}$

Note: This section was also stated in 5-5 in *Course 1*, but no negative integers were involved.

Chapter 4 Patterns and Functions

Chapter 4 dealt with patterns and functions which had 7 sections including an extension section.

4-1 The Coordinate Plane

Example 1 Identifying Quadrants on a Coordinate Plane

Example 2 Plotting Points on a Coordinate Plane

Example 3 Identifying Points on a Coordinate Plane

Note: This section was also introduced in 11-3 in *Course 1*.

4-2 Tables and Graphs

Example 1 Identifying Ordered pairs from a Table of Values

Write ordered pairs from the table.

The ordered pairs are (5, 6), (7,7), (9,7), and (11,9).

Example 2 Graphing Ordered pairs from a Table of Values

Write and graph the ordered pairs from the table.

The ordered pairs are (-3, 4), (-1, 1), (1, -2), and (3, -5).

Plot the points on a coordinate plane.

Note: This section was also introduced in 11-10 in *Course 1*.

4-3 Interpreting Graphs

Example 1 Relating Graphs to Situations.

Example 2 Problem solving Application

Note: This section was partially new to students. More interpretation of graphs should be introduced in the section.

4-4 Functions, Tables, and Graphs

Vocabulary *function input output*

Example 1 Completing a Function Table.

Example 2 Graphing Function Using Ordered Pairs

Note: The section was also stated in 11-9 in *Course 1*

4-5 Problem solving Skill: Find a pattern in Sequences

Vocabulary *sequence term arithmetic sequence geometric sequence*

Example 1 Identifying patterns in Sequences

Example 2 Identifying Functions in Sequences

Example 3 Using Functions to Extend Sequences

Note: This section was also introduced in 1-7 in *Course 1* regarding arithmetic sequences. Unfortunately, there was no formula or rule as to how to find arithmetic sequence and geometric sequence. That was a great pity.

4-6 Graphing Linear Functions

Vocabulary *linear equation linear function*

Example 1 Graphing Linear Functions

Graph the linear function $y = 2x + 1$

Note: This section was also stated in 11-10 in *Course 1*.

Extension Nonlinear Functions

Vocabulary *nonlinear function*

Example 1 Identifying Graphs of Nonlinear Functions

Example 2 Identifying Nonlinear Relationships in Function Tables

Note: This section was not supposed to be stated here. If it was to be introduced, it should be explained deep with sections of linear functions; otherwise it should be introduced in great details in *Course 3*.

Chapter 5

Proportional Relationships

Chapter 5 dealt with proportional relationships. It had 10 sections including an extension section.

5-1 Ratios

Vocabulary *ratio*

Example 1 Writing Ratios

Example 2 Writing Ratios in Simplest Form

Note: The section was also introduced in 7-1 in *Course 1*.

5-2 Rates

Vocabulary *rate* *unit rate*

Example 1 Finding Unit Rates

A) During exercise, Sonia's heart beats 675 times in 5 minutes. How many times does it beat per minute?

$$\frac{675 \text{ beats}}{5 \text{ minutes}} = \frac{135 \text{ beats}}{1 \text{ minutes}}$$

Example 2 Finding Average Speed

Note: This section was also introduced in 7-1 in *Course 1*. Both ratios and rates were stated in *Course 1*. Why was it again stated here with no new knowledge added to both sections.

5-3 Slope and Rates of Change

Vocabulary *slope*

Example 1 Identifying the Slope of the Line

Tell whether the slope is positive or negative. Then find the slope.

Example 2 Using Slope and a Point to Graph a Line

Use the given slope and point to graph each line.

Example 3 Identifying Rates of Change in Graphs

Tell whether each graph shows a constant or variable rate of change.

Example 4 Using Rate of Change to solve Problems

Note: This section was new in this book of *Course 2*.

5-4 Identifying and Writing Proportions

Vocabulary *equivalent ratios* *proportion*

Example 1 Comparing Ratios in Simplest Form

Determine whether the ratios are proportional.

Example 2 Comparing Ratios Using a Common Denominator

Example 3 Finding Equivalent Ratios and Writing Proportions

Note: This section was also stated in 7-3 in *Course 1*.

5-5 Solving Proportions

Vocabulary *cross product*

Example 1 solving Proportions Using Cross Products

Note: This section was also introduced in 7-2 in *Course 1*.

5-6 Customary Measurements

Example 1 Choosing the Appropriate Customary Unit

Example 2 Converting Customary Units

Example 3 Adding or Subtracting Mixed Units of Measure

Note: This section was also stated in 9-1 in *Course 1*.

5-7 Similar Figures and Proportions

Vocabulary *similar* *corresponding sides* *corresponding angles*

Example 1 Determining Whether Two Triangles Are Similar

Tell whether the triangles are similar.

Example 2 Determining whether Two Four-sided figures Are Similar.

Tell whether the figures are similar.

Note: This section was also stated in 7-4 in *Course 1*.

5-8 Using Similar Figures

Vocabulary *indirect measurement*

Example 1 Finding Unknown Lengths in Similar Figures

Example 2 Measurement Application

Example 3 Estimating with Indirect Measurement

Note: This section was also stated in 7-4 in *Course 1*.

5-9 Scale Drawings and Scale Models

Vocabulary *scale model* *scale factor* *scale drawing*

Example 1 Finding a Scale Factor

Example 2 Using Scale Factors to Find Unknown Lengths

Example 3 Measurement Application

Note: This section was also introduced in 7-6 in *Course 1*.

Extension Dimensional Analysis

Example 1 Making Unit Conversions

Use a unit conversion factor to covert 80 miles per hour to feet per hour.

$$\frac{80\ \cancel{\text{mi}}}{1\ \text{hr}} \cdot \frac{5{,}280\ \text{ft}}{1\ \cancel{\text{mi}}} = \frac{80 \cdot 5{,}260\ \text{ft}}{1\ \text{hr}} = \frac{422{,}400\ \text{ft}}{1\ \text{hr}}$$

Eighty miles per hour is 422,400 feet per hour.

Note: This section was also introduced in 9-3 in *Course 1*. Why was it introduced again in Extension Section?

Chapter 6

Percents

Chapter 6 dealt with percents. It had 7 sections in it.

6-1 Percents

Vocabulary *percent*

Example 1 Modeling Percents

Example 2 Writing Percents as Fractions

Example 3 Writing Percents as Decimals

Note: This section was also introduced in 7-7 in *Course 1*.

6-2 Fractions, Decimals, and Percents

Example 1 Writing Decimals as Percents

Example 2 Writing Fractions as Percents

6-3 Problem Solving Skill: Estimate with Percents

Example 1 Using Fractions to Estimate Percents

Example 3 Estimating with Simple Percents

Note: This section was also stated in 4-9 in *Course 1*.

6-4 Percent of a Number

$$\frac{\text{part}}{\text{whole}} = \frac{67}{100} = \frac{n}{90}$$

Example 1 Using Proportions to Find Percents of Numbers

Find the percent of each number.

A) 67% of 90 $\rightarrow \frac{67}{100} = \frac{n}{90}$ $n = 60.3$ $\rightarrow$ 67% of 90 is 60.3.

Example 2 Using Decimal Equivalents to Find Percents of Numbers

Find the percent of each number. Check whether your answer is reasonable.

A) 8% of 50 = 0.08 · 50 = 4
B) 0.5% of 36 = 0.005 · 36 = 0.18

Note: This section was also introduced in 7- 9 in *Course 1* with a formula $\frac{\text{is}}{\text{of}} = \frac{\%}{100}$. The formula $\frac{\text{is}}{\text{of}} = \frac{\%}{100}$ should be shown in the section again. Unfortunately, different methods to find percent of a number or percent change were not fully covered in this section. The formula $\frac{\text{is}}{\text{of}} = \frac{\%}{100}$ was not enough. Since students already learned how to find percent change, new ways should be introduced. Isn't it "a mile wide and an inch deep?"

6-5 Solving Percent Problems

Applying Percents

Example 1 Using Proportions to Solve Problems with Percent

A) What percent of 90 is 45?
$\frac{n}{100} = \frac{45}{90} \rightarrow n = 50$ 50% of 90 is 50.

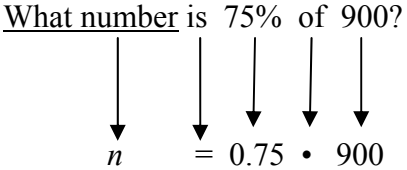
B) 12 is 8% of what number?
$\frac{8}{100} = \frac{12}{n} \rightarrow n = 150$ 12 is 8% of 150.

Example 2 Using Equations to solve Problems with Percents

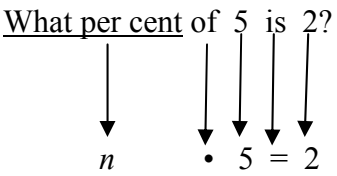
A) What percent of 75 is 150?
$n \cdot 75 = 105 \rightarrow n = 140\%$ 140% of 75 is 105.
B) 48 is 20% of what number?
$48 = 20\% \cdot n \rightarrow n = 140\%$ 48 is 20% of 240

Note: This section was also stated in 7-9 in *Course 1*. The writer thought there were three types of percent problems that the compilers should include in the book. Each type involved three numbers. Although the formula $\frac{\text{is}}{\text{of}} = \frac{\%}{100}$ was good, different types of solving percent problems should be introduced. When you know two of the numbers, you can write an equation and solve it to find the third number. For example:

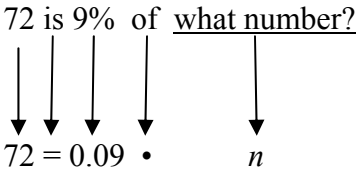
Finding a Per Cent of a Number



Finding What Per Cent a Number is of Another?



Finding a Number Given is Per Cent



Note: These three types of per cent problems were essential to those students who were confused with the formula $\frac{\text{is}}{\text{of}} = \frac{\%}{100}$, because the writer found that some students(especially those students with special needs in regular classrooms) did not know how to set up an equation with the formula $\frac{\text{is}}{\text{of}} = \frac{\%}{100}$.

6-6 Percent of Change

Vocabulary *percent of change* *percent of increase* *percent of decrease*

Percent of change $= \frac{\textbf{amount of change}}{\textbf{original amount}}$

Example 1 Finding Percent of Change

A) 27 is decreased to 20 → 27-20 = 7 Percent of change = $\frac{7}{27} \approx 0.259 \approx 25.9\%$

B) 32 is increased to 67→ 67 – 32 = 35 → $\frac{35}{32} = 1.09375 \approx 109.4\%$

Example 2 Using Percent of Change

The regular price of an MP3 player is $79.99 with 25% off. What is the sale price?

$25\% \cdot 79.99 = d \rightarrow d \approx \$20.00$

The sale price: $79.99 - $20.00 = $59.99.

Note: This section was also stated in 7-10 in *Course 1*.

6-7 Simple Interest

Vocabulary *interest* *simple interest* *principal*

Formula: $I = p \cdot r \cdot t$

Example 1 Using the Simple Interest Formula

I = \$300, P = \$1,000, r = ? , t = 5 years

$300 = 1{,}000 \cdot r \cdot 5 \rightarrow 300 = 5{,}000r \rightarrow 0.06 = r$ The interest rate is 6%.

Note: This section was also stated in Extension in Chapter 7 of *Course 1*, p. 400.

Chapter 7

Collecting, Displaying and Analyzing Data

Chapter 7 dealt with collecting, displaying and analyzing data. It had 10 sections.

7-1 Frequency Tables, Stem-and Leaf Plots, and Line Plots

Vocabulary *frequency table cumulative frequency stem-and-leaf plot line plot*

Example 1 Organizing and Interpreting Data in a Frequency Table

Example 2 Organizing and Interpreting Data in a Stem-and-Leaf Plot

Example 3 Organizing and Interpreting Data in a Line Plot

Note: This section (Example 1 and Example 2) was also stated in 6-5 and 6-9 of *Course 1*.

7-2 Mean, Median, Mode, and Range

Vocabulary *mean median mode range outlier*

Example 1 Finding the mean, Median, Mode, and Range of a Data Set

Example 2 Choosing the Best Measure to Describe a Set of Data

Example 3 Exploring the Effects of Outliers on Measures of Central Tendency

Note: This section was also stated in 6-2 of *Course 1*.

7-3 Bar Graphs and Histograms

Vocabulary *bar graph double-bar graph histogram*

Example 1 Interpreting a Bar Graph

Example 2 Making a double-Bar Graph

Example 3 Making a Histogram

Note: This section was also stated in 6-4 and 6-5 of *Course 1*.

7-4 Reading and Interpreting Circle Graphs

Vocabulary *circle graph* *sector*

Example 2 Interpreting Circle Graphs

Example 3 Choosing an Appropriate Graph

Note: This section was also introduced in *Course 1*, but it didn't go deep. On Page 524 (*Course 1*), only how to "Construct Circle Graphs" was introduced. More should be done about circle graphs in that page.

7-5 Box-and Whisker Plots

Vocabulary *box-and-whisker plot* *lower quartile* *upper quartile* *inter-quartile range*

Example 1 Making a Box-and-Whisker Plot

Example 2 Comparing Box-and-Whisker Plots

Note: This section was also shallowly introduced on Page 790, *Course 1*. It only showed the definition and the graph, but how to make a Box-and-Whisker Plot and how to analyze the data were not introduced on that page.

7-6 line Graphs

Vocabulary *line graph* *double-line graph*

Example 1 Making a Line Graph

Example 2 Using a Line Graph to Estimate Data

Example 3 Making a Double-Line Graph

Note: This section was also stated in 6-7 in *Course 1*.

7-7 Choosing an Appropriate Display

Example 1 Choosing an Appropriate Display

Example 2 Identifying the Most Appropriate Display

Note: This section was also introduced in 6-10 of *Course 1*.

7-8 Populations and Samples

Example 1 Analyzing Sampling Methods

Example 2 Identifying Potentially Biased Sample

Example 3 Verifying claims Based on Statistical Data

Note: This section was new to students in *Course 2*.

7-9 Scatter Plots

Example 1 Making a Scatter Plot

Example 2 Determining Relationships Between Two Sets of Data

Note: This section was new to students in *Course 2*.

7-10 Misleading Graphs

Example 1 social Studies Application

Example 2 Analyzing Misleading Graphs

Note: This section was also introduced in 6-8 of *Course 1*.

Chapter 8

Geometric Figures

Chapter 8 dealt with geometric figures. It had 12sections including an extension section.

8-1 Building Blocks of Geometry

Vocabulary *point line plane ray line segment congruent*

Example 1 Identifying Points, Lines and Planes

Example 2 Identifying Line Segments and Rays

Example 3 Identifying Congruent Line Segment

Note: This section was also introduced in 8-1 in *Course 1*.

8-2 Classifying Angles

Vocabulary *angle vertex right angle obtuse angle straight angle complementary angle supplementary angles*

Example 1 Classifying Angles

Example 2 Identifying Complementary and Supplementary Angles

Example 3 Finding Angle Measures

Note: This section was also introduced in 8-2 and 8-3 in *Course 1*

8-3 Angle Relationships

Vocabulary *perpendicular lines parallel lines skew lines adjacent angles vertical angles transversal corresponding angles*

Example 1 Identifying Parallel, Perpendicular, and Skew lines

Example 2 Using Angle Relationships to find Angle Measures

Line n || line p. Find the measure of each angle.

Note: This section was also introduced in 8-3 in *Course 1*.

8-4 Properties of Circles

Vocabulary *circle center of a circle arc radius diameter chord central angle sector*

Example 1 Identifying Parts of Circles

Note: This section was also introduced in 9-8 of *Course 1*. Since students already learned how to find circumferences and area of circles (10-5, *Course 1*), the compilers should include the information as to how to find the radius and diameter if area or circumference were given. Some students did not know how to solve such problems.

8-5 Classifying Polygons

Vocabulary *polygon regular polygon*

Example 1 Identifying Polygons

Determine whether each figure is a polygon. If it is not, explain why not.

Example 2 Classifying Polygons

Example 3 Identifying and Classifying Regular Polygons

Note: This section was also introduced in 8-7 in *Course 1*.

8-6 classifying Triangles

Vocabulary *scalene triangle isosceles triangle equilateral triangle actue triangle obtuse triangle right angle*

Example 1 Classifying Triangles

Example 2 Identifying Triangles

Note: This section was also introduced in 8-5 in *Course 1*.

8-7 Classifying Quadrilaterals

Vocabulary *parallelogram rectangle rhombus square trapezoid*

Example 1 Classifying Quadrilaterals

Example 2 Drawing Quadrilaterals

Note: This section was also introduced in 8-6 in *Course 1*.

8-8 Angles in Polygons

Example 1 Finding an Angle Measure in a Triangle

Find the unknown angle measure in the triangle.

$25^0 + 37^0 + x = 180^0 \quad x = 118^0$

Example 2 Finding an Angle Measure in a Quadrilateral

Find the unknown angle measure in the quadrilateral.

$98^0 + 137^0 + 52^0 + x = 360^0 \qquad x = 73^0$

Example 3 Drawing Triangles to Find the Sum of Interior Angles

Divide the polygon into triangles to find the sum of its angle measures.

Note: This section was also introduced in 8-5 in *Course 1* although not much detail was stated in that section.

8-9 Congruent Figures

Example 1 Identifying Congruent Figures in the Real World

Example 2 Identifying Congruent Triangles

Example 3 Using Congruent to Find Missing Measures

Note: This section was also stated in 8-9 in *Course 1* although not much detail was made in that section.

8-10 Translations, Reflections, and Rotations

Vocabulary *transformation image translation reflection line of reflection rotation*

Example 1 Identifying Types of Translations

Example 2 Graphing Translations on a Coordinate Plane

Example 3 Graphing Reflections on a Coordinate Plane

Example 4 Graphing Rotations on a Coordinate Plane

Note: This section was also introduced in 8-10 of *Course 1* although not much detail was made in that section. In this section Examples 2, 3, and 4 were partly new to students because more details on graphing and transformation were introduced.

8-11 Symmetry

Vocabulary *line symmetry line of symmetry asymmetry rotational symmetry center of rotation*

Example 1 Identifying Line Symmetry

Example 2 Social Studies Application

Example 3 Identifying Rotational Symmetry

Note: This section was also stated in 8-11 of *Course 1*.

Extension Dilations

Vocabulary *dilation*

Example 1 Identifying Dilations

Example 2 Using a Dilation to Enlarge a Figure

Example 3 Using a Dilation to Reduce a Figure

Note: This section was new to students.

Chapter 9

Measurement: Two-Dimensional Figures

Chapter 9 dealt with measurement regarding two-dimensional figures 9 sections including an extension section.

9-1 Accuracy and Precision

Vocabulary *precision accuracy significant digits*

Example 1 Judging Precision of Measurements

Example 2 Identifying Significant Digits

Example 3 Using Significant Digits in Addition or Subtraction

Example 4 Using Significant Digits in Multiplication or Division

Note: This section was also stated in 9-1, 9-2, 9-3, and 9-4 of *Course 1* although much information was not introduced as to how to judge precision of measurements there. In this section much detail was introduced regarding accuracy and precision.

9-2 Perimeter and Circumference

Vocabulary *perimeter* *circumference*

Example 1 Finding the Perimeter of a Polygon

Example 2 Using Properties of a Rectangle to Find Perimeter

Example 3 Finding the Circumference of a Circle

Note: This section was also introduced in 9-8 of *Course 1*.

9-3 Area of Parallelograms

Vocabulary *area*

Example 1 Finding the Area of a Rectangle

Example 2 Finding Length or Width of a Rectangle

Example 3 Finding the Area of a Parallelogram

Note: This section was also introduced in 10-1, 10-2, and 10-3 of *Course 1*.

9-4 Area of Triangles and Trapezoids

Example 1 Finding the Area of a Triangle

Example 2 Finding the Area of a Trapezoid

Note: This section was also introduced in 10-2 of *Course 1*.

9-5 Area of Circles

Example 1 Finding the Area of a Circle

Example 2 Social Studies Application

Example 3 Measurement Application

Note: This section was also introduced in 10-5 of *Course 1*.

9-6 Area of Irregular Figures

Example 1 Estimating the Area of an Irregular Figure

Example 2 Finding the Area of an Irregular Figure

Example 3 Problem Solving Application

Note: This section was also introduced in 10-3 of *Course 1*. That was an important section regarding composite figures. More detail and variety of exercises should be included so that students could practice solving problems with irregular figures because the writer found that some students had difficulty finding the areas or perimeter of composite figures.

9-7 Squares and Square Roots

Vocabulary *perfect square* *square root* *radical sign*

Example 1 Finding Squares of Numbers

Example 2 Finding Square Roots of Perfect Squares

Example 3 Estimating Square Roots

Note: This section was new to students.

9-8 The Pythagorean Theorem

Vocabulary *leg* *hypotenuse* *Pythagorean Theorem*

Formula: $a^2 + b^2 = c^2$

Example 1 Calculating the Length of a Side of a Right Triangle

Note: This section was new to students.

Extension Identifying and Graphing Irrational Numbers

Vocabulary *irrational numbers*

Example 1 Identifying Rational and Irrational Numbers

Example 2 Graphing Rational Number and Irrational Numbers

Note: This section was new to students.

Chapter 10

Measurement: Three-Dimensional figures

Chapter 10 dealt with measurement regarding three-dimensional figures. It had 5 sections including an extension section.

10-1 Introduction to Three-Dimensional Figures

Vocabulary *face edge polyhedron vertex base prism pyramid cylinder cone*

Example 1 Naming Prism and Pyramids

Example 2 Classifying Three-Dimensional Figures

Note: This section was also introduced in 10-6 of *Course 1*.

10-2 Volume of Prism and Cylinders

Vocabulary *volume*

Example 1 Using Cubes to Find the Volume of a Rectangular Prism

Example 2 Using a Formula to Find the Volume of a Prism

Example 3 Using a Formula to Find the Volume of a Cylinder

Note: This section was also introduced in 10-7 and 10-8 of *Course 1*.

10-3 Volume of Pyramids and Cones

Example 1 Finding the Volume of a Rectangular Pyramid

Example 2 Finding the Volume of a Cone

Note: This section was new to students regarding the volume of rectangular pyramid and a cone.

10-4 Surface Area of Prisms and Cylinders

Vocabulary *net surface area*

Example 1 Finding the Surface Area of a Prism

$S = 2lw + 2lh + 2wh$

Example 2 Problem Solving Application

Note: This section was also introduced in 10-9 of *Course 1*, but lateral areas were not introduced yet in this section.

10-5 Changing Dimensions

Example 1 Finding the Surface Area of a Similar Figure

A) The surface area of a box is 27 in^2. What is the surface area of a similar box that is larger by a scale factor of 5?
$S = 27 \cdot 5^2 = 675 in^2$

Example 2 Finding Volume Using Similar Figures

Note: This section was new to students.

Extension Cross Sections

Vocabulary *cross section*

Example 1 Identifying Cross Sections

Example 2 Sketching and Describing Cross Sections

Example 3 Describing Three-Dimensional Figures Formed by Transformations

Note: This section was new to students.

Chapter 11

Probability

Chapter 11 dealt with probability. It had 7 sections in it..

11-1 Probability

Vocabulary *experiment trial outcome event probability complement*

Example 1 Determine the Likelihood of an Event

Example 2 Using Complements

Note: This section was also introduced in 12-1 of *Course 1*.

11-2 Experimental Probability

Vocabulary *experimental probability*

Formula: probability $\approx \frac{number\ of\ times\ the\ event\ occurs}{total\ number\ of\ trials}$

Example 1 Sports Application

Example 2 Weather Application

Note: This section was also introduced in 12-2 in *Course 1*.

11-3 Problem Solving Skill: Make a List to Find Sample Spaces

Vocabulary *sample space* *Fundamental Counting Principle*

Example 1 Problem Solving Application

Example 2 Using a Tree Diagram to Find a Sample Space

Note: This section was also introduced in 12-3 of *Course 1*.

11-4 Theoretical Probability

Vocabulary *theoretical probability*

Formula: probability = $\frac{\textbf{number of ways the event can occur}}{\textbf{total number of eqaullly likely outcomes}}$

Example 1 Finding Theoretical Probability

Example 2 School Application

Note: This section was also introduced in 12-4 of *Course 1*.

11-5 Probability of Independent and Dependent Events

Vocabulary *independent events* *dependent events*

Example 1 Determining Whether Events Are Independent or Dependent

Example 2 Finding Probability of Independent Events

Example 3 Finding the Probability of Dependent Events

Note: This section was new to students, but the section didn't mention "with or without replacement" when students solved probability of independent and dependent events.

11-6 Combinations

Vocabulary *combination*

Example 1 Using a Table to Find Combination

How many different combinations of two books are possible from Mrs. Logan's list

of five books?

There are 10 different combinations of two books on Mrs. Logan's list of five books.

Example 2 Problem Solving Application

Note: This section was new to students regarding combination. The book didn't mention the formula: nCr or $\frac{nPr}{r}$.

11-6 Permutations

Vocabulary *permutation* *factorial*

Example 1 Using a List to Find Permutation

Example 2 Using the Fundamental Counting Principle to find the Number of Permutation

Example 3 Using Factorials to Find the Number of Permutations

Note: This section was new to students in *Course 2*.

Chapter 12

Multi-Step Equations and Inequalities

Chapter 12 dealt with multi-step equations and inequalities. It had 8 sections including an extension section.

12-1 Solving Two-Step Equations

Example 1 Solving Two-Step Equations Using division

A) $2n + 5 = 13 \rightarrow 2n + 5 - 5 = 13 - 5 \rightarrow 2n = 8 \rightarrow n = 4$

B) $19 = -3p - 8$

Example 2 Solving Two-Step Equations Using Multiplication

A) $8 + \frac{m}{4} = 17$

B) $3 = \frac{u}{6} - 12$

Example 3 Fitness Application

Note: This section was also introduced in 2-4 of *Course 1*.

12-2 Solving Multi-Step Equations

Example 1 Combining Like Terms to Solve Equations

Solve $7n - 1 - 2n = 14 \rightarrow 5n - 1 = 14 \rightarrow 5n = 15 \rightarrow n = 3$

Example 2 Using the Distributive Property to Solve Equations

Solve $3(z - 1) + 8 = 14$

Example 3 Problem Solving Application

Note: This section was also introduced in 11-8 of *Course 1*. More exercises should be included regarding the combination of like terms; especially more exercises should be added with integers, decimals, and fraction.

12-3 Solving Equations with Variables on Both sides

Example 1 Using Inverse Operations to Group Terms with Variable

A) $6m = 4m + 12 \rightarrow 6m - 4m = 4m - 4m + 12 \rightarrow 2m = 12$
B) $-7x - 198 = 5x \rightarrow -7x + 7x - 198 = 5x + 7x \rightarrow -198 = 12x$

Example 2 Solving Equations with Variables on Both Sides

A) $5n = 3n + 26$
B) $19 + 7n = -2n + 37$
C) $\frac{5}{9}x = \frac{4}{9}x + 9 \rightarrow \frac{5}{9}x - \frac{4}{9}x = \frac{4}{9}x - \frac{4}{9}x + 9 \rightarrow \frac{1}{9}x = 9 \rightarrow (9)\frac{1}{9}x = (9)9 \rightarrow x = 81$

Note: This section was new to students.

12-4 Inequalities

Vocabulary *inequality algebraic inequality solution set compound inequality*

Example 1 Writing Inequality

A) There are at least 25 students in the auditorium.
Number of students ≥ 25 ("At least" means greater than or equal to.)
B) No more than 150 people can occupy the room.
Room capacity ≤ 150 ("No more than" means less than or equal to.)

Example 2 Graphing Simple Inequality

A) $x > -2$
B) $-1 \geq y$

A **compound inequality** is the result of combining two inequalities. The words *and* and *o*r are used to describe how parts are related.

$x > 3$ or $x < -1$ → *x is either greater than 3 or less than -1*

$-2 < y$ and $y < 4 \rightarrow$ *y is both greater than -2 and less than 4. y is between -2 and 4.*

Example 3 Graphing Compound Inequalities

Note: This section was also stated in the extension section of Chapter 2 of *Course 1*.

12-5 Solving Inequalities by Adding or Subtracting

Example 1 Solving Inequalities by Adding

A) $x - 12 > 32$
B) $-14 \geq y - 8$

Example 2 Solving Inequalities by Subtracting

A) $C + 9 < 20$
B) $-2 < x + 16$

Example 3 Weather Application

Note: This section was new to students in *Course 2*.

12-6 Solving Inequalities by Multiplying or Dividing

Example 1 Solving Inequalities by Multiplying

A) $\frac{x}{11} < 3 \rightarrow (11)\frac{x}{11} < (11)\,3 \rightarrow x < 33$
B) $4.8 \leq \frac{r}{-16}$

Example 2 Solving Inequalities by Diving

A) $4x > 9 \rightarrow \frac{4x}{4} > \frac{9}{4} \rightarrow x > \frac{9}{4}$, or $2\frac{1}{4}$

Note: This section was new to students in *Course 2*.

12-7 Solving Two-Step Inequalities

Example 1 Solving Two-Step Inequalities

A) $\frac{x}{5} - 15 < 10 \rightarrow \frac{x}{5} - 15 + 15 < 10 + 15 \rightarrow \frac{x}{5} < 25 \rightarrow (5)\frac{x}{5} < (5)25 \rightarrow x < 125$
B) $42 \leq \frac{y}{-9} + 10$
C) $3x - 12 \geq 9$
D) $10 > -4y + 6$

Note: This section was new to student. However, if students knew how to solve equations, it would not be difficult to solve problems with two-step inequalities.

Extension Solving for a Variable

Example 1 Solving for Variable in Formulas

Solve d = rt for.

$$d = rt \rightarrow \frac{d}{t} = \frac{rt}{t} \rightarrow \frac{d}{t} = r$$

Note: This section was new to student. This was a good section. Many exercises were shown on page711. It would be a pity if the teaching of this extension section was skipped. Some students knew, for example, how to find areas of circles, but they did not know how to find a radius if the area of a circle was given; they did not know how to find a height of a cone if the volume of the cone was given, *etc.* This section was very important. Unfortunately, the compilers of the textbook placed the section at the end of the book (it was suspected that the section was *never* taught because of the extension).

F. Table 2B

(Mathematics *Course 2*)

Mathematics *Course 2* was analyzed. The following mini-tables were shown to see whether the contents of each chapter were overlapped in each grade (*Course 1*, *Course 2*, and *Course 3*). For example, when *1-1 Numbers and Patterns* were shown in Mathematics *Course 2* below, it meant *1-1 Numbers and Patterns* section in *Course 2* was also introduced or mentioned in Mathematics *Course 1* or even in *Course 3*. They were somewhat related.

Chapter 1 Algebraic Reasoning

Names of Text Books	Mathematics *Course 1*	Mathematics *Course 2*	Mathematics *Course 3*
Contents	1-7 Pattern and Sequences 8-8 Geometric Patterns	1-1 Numbers and Patterns	3-6 Arithmetic Sequences 13-1 Terms of Arithmetic Sequences

Names of Text Books	Mathematics *Course 1*	Mathematics *Course 2*	Mathematics *Course 3*
Contents	1-3 Exponent	1-2 Exponents	4-1 Exponents

Names of Text Books	Mathematics *Course 1*	Mathematics *Course 2*	Mathematics *Course 3*
Contents	9-2 Understanding Customary Units of Measure 9-3 Converting Customary Units 9-4 Converting Metric Units	1-3 Metric Measurements	5-3 Dimensional Analysis

Names of Text Books	Mathematics *Course 1*	Mathematics *Course 2*	Mathematics *Course 3*
Contents	1-3 Exponents 3-4 Scientific Notation	1-4 Applying Exponents	4-4 Scientific Notation

Names of Text Books	Mathematics *Course 1*	Mathematics *Course 2*	Mathematics *Course 3*
Contents	1-4 Order of Operations	1-5 Order Operations	p.828 (Summary)

Names of Text Books	Mathematics *Course 1*	Mathematics *Course 2*	Mathematics *Course 3*
Contents	1-5 Mental Math	1-6 Properties	P. 829 (Summary)

Names of Text Books	Mathematics *Course 1*	Mathematics *Course 2*	Mathematics *Course 3*
Contents	2-1 Variables and Expressions 2-4 Equations and Their Solution	1-7 Variables and Algebraic Expressions	1-1 Variables and Expressions

Names of Text Books	Mathematics *Course 1*	Mathematics *Course 2*	Mathematics *Course 3*
Contents	2-2 Problem Solving Skill: Translate Between Words and Math	1-8 Translate Words into Math	1-2 Algebraic Expressions

Names of Text Books	Mathematics *Course 1*	Mathematics *Course 2*	Mathematics *Course 3*
Contents	None	1-9 Simplifying Algebraic Expressions	1-1 Variables and Expressions

Names of Text Books	Mathematics *Course 1*	Mathematics *Course 2*	Mathematics *Course 3*
Contents	2-4 Equations and Their Solution	1-10 Equations and Their Solutions	1-7 Solving Equations by Adding or Subtracting

Names of Text Books	Mathematics *Course 1*	Mathematics *Course 2*	Mathematics *Course 3*
Contents	2-5 Addition Equations 2-6 Subtraction Equation	1-11Addition and Subtraction Equations	1-7 Solving Equations by Adding or Subtracting

Names of Text Books	Mathematics *Course 1*	Mathematics *Course 2*	Mathematics *Course 3*
Contents	2-7 Multiplication Equation 2-8 Division Equation	1-12 Multiplication and Division Equation	1-8 Solving Equations by Multiplying or Dividing

Chapter 2 Integers and Rational Numbers

Names of Text Books	Mathematics *Course 1*	Mathematics *Course 2*	Mathematics *Course 3*
Contents	11-1 Integers in Real-World Situation 11-2 Comparing and Ordering Integers	2-1 Integers	1-3 Integers and Absolute Value

Names of Text Books	Mathematics *Course 1*	Mathematics *Course 2*	Mathematics *Course 3*
Contents	11-4 Adding Integers	2-2 Adding Integers	1-4 Adding Integers

Names of Text Books	Mathematics *Course 1*	Mathematics *Course 2*	Mathematics *Course 3*
Contents	11-5 Subtracting Integers	2-3 Subtracting Integers	1-5 Subtracting Integers

Names of Text Books	Mathematics *Course 1*	Mathematics *Course 2*	Mathematics *Course 3*
Contents	11-6 Multiplying Integers 11-7 Dividing Integers	2-4 Multiplying and Dividing Integers	1-6 Multiplying and Dividing Integers

Names of Text Books	Mathematics *Course 1*	Mathematics *Course 2*	Mathematics *Course 3*
Contents	11-8 Solving Integers Equations	2-5 Solving Equations Containing Integers	1-7 Solving Equations by Adding or Subtracting 1-8 Solving Equations by Multiplying and Dividing

Names of Text Books	Mathematics *Course 1*	Mathematics *Course 2*	Mathematics *Course 3*
Contents	4-1 Divisibility 4-2 Factors and Prime Factorization	2-6 Prime Factorization p.7667	P. 822 p.823

Names of Text Books	Mathematics *Course 1*	Mathematics *Course 2*	Mathematics *Course 3*
Contents	4-3 Greatest Common Factor	2-7 Greatest Common Factor	P. 824

Names of Text Books	Mathematics *Course 1*	Mathematics *Course 2*	Mathematics *Course 3*
Contents	5-1 Least Common Multiple	2-8 Least Common Multiple	2-2 Comparing and Ordering Rational Numbers

Names of Text Books	Mathematics *Course 1*	Mathematics *Course 2*	Mathematics *Course 3*
Contents	4-5 Equivalent Fractions 4-6 Mixed Numbers and Improper Fractions	2-9 Equivalent Fractions and Mixed Numbers	5-1 Ratios and Proportions

Names of Text Books	Mathematics *Course 1*	Mathematics *Course 2*	Mathematics *Course 3*
Contents	4-4 Decimals and Fraction	2-10 Equivalent Fractions and Decimals	2-1 Rational Numbers 6-1 Relating Decimals, Fractions and Percents

Names of Text Books	Mathematics *Course 1*	Mathematics *Course 2*	Mathematics *Course 3*
Contents	3-1 Representing, Comparing, and Ordering Decimals	2-11 Comparing and Ordering Rational Numbers 4-4 Decimals and Fractions	6-1 Relating Decimals, Fractions and Percents

Names of Text Books	Mathematics *Course 1*	Mathematics *Course 2*	Mathematics *Course 3*
Contents	None	Extension: Negative Exponents	4-2 Look for a Pattern in Integers Exponents 4-4 Scientific Notation

Chapter 3 Applying Rational Numbers

Names of Text Books	Mathematics *Course 1*	Mathematics *Course 2*	Mathematics *Course 3*
Contents	3-2 Estimating Decimals	3-1 Problem Solving Skills: Estimate with Decimals	p.820

Names of Text Books	Mathematics *Course 1*	Mathematics *Course 2*	Mathematics *Course 3*
Contents	3-3 Adding and Subtracting Decimals	3-2 Adding and Subtracting Decimals	2-3 Adding and Subtracting Rational Numbers

Names of Text Books	Mathematics *Course 1*	Mathematics *Course 2*	Mathematics *Course 3*
Contents	3-5 Multiplying Decimals	3-3 Multiplying Decimals	2-4 Multiplying Rational Numbers

Names of Text Books	Mathematics *Course 1*	Mathematics *Course 2*	Mathematics *Course 3*
Contents	3-6 Dividing Decimals by Whole Numbers 3-7 Dividing Decimals	3-4 Dividing Decimals by Integers	2-5 Dividing Rational Numbers

Names of Text Books	Mathematics *Course 1*	Mathematics *Course 2*	Mathematics *Course 3*
Contents	3-7 Dividing Decimals	3-5 Dividing Decimals and Integers by Decimals	2-5 Dividing Rational Numbers

Names of Text Books	Mathematics *Course 1*	Mathematics *Course 2*	Mathematics *Course 3*
Contents	3-9 Solving Decimals Equations	3-6 Solving Equations Containing Decimals	2-7 Solving Equations with Rational Numbers

Names of Text Books	Mathematics *Course 1*	Mathematics *Course 2*	Mathematics *Course 3*
Contents	4-9 Estimating Fractions Sums and Difference	3-7 Problem Solving Skills: Estimate with Fractions	6-2 Estimating with Percents

Names of Text Books	Mathematics *Course 1*	Mathematics *Course 2*	Mathematics *Course 3*
Contents	4-8 Adding and Subtracting with Like Denominators 5-2 Adding and Subtracting with Unlike Denominators	3-8 Adding and Subtracting Fractions	2-6 Adding and Subtracting with Unlike Denominators

Names of Text Books	Mathematics *Course 1*	Mathematics *Course 2*	Mathematics *Course 3*
Contents	5-3 Adding and Subtracting Mixed Numbers	3-9 Adding and Subtracting Mixed Numbers	2-6 Adding and Subtracting with Unlike Denominators

Names of Text Books	Mathematics *Course 1*	Mathematics *Course 2*	Mathematics *Course 3*
Contents	5-8 Multiplying Mixed Numbers	3-10 Multiplying Fractions and Mixed Numbers	2-4 Multiplying Rational Numbers

Names of Text Books	Mathematics *Course 1*	Mathematics *Course 2*	Mathematics *Course 3*
Contents	5-9 Dividing Fractions and Mixed Numbers	3-11 Dividing Fractions and Mixed Numbers	2-5 Dividing Rational Numbers

Names of Text Books	Mathematics *Course 1*	Mathematics *Course 2*	Mathematics *Course 3*
Contents	5-5 Solving Fraction Equations: Addition and Subtraction	3-12 Solving Equations Containing Fractions	2-7 Solving Equations with Rational Numbers

Chapter 4 Patterns and Functions

Names of Text Books	Mathematics *Course 1*	Mathematics *Course 2*	Mathematics *Course 3*
Contents	6-6 Ordered Pairs 11-3 The Coordinate Plane	4-1 The Coordinate Plane	3-1 Ordered Pair 3-2 Graphing on a Coordinate Plane

Names of Text Books	Mathematics *Course 1*	Mathematics *Course 2*	Mathematics *Course 3*
Contents	11-10 Graphing Functions	4-2 Tables and Graphs	3-2 Graphing on a Coordinate Plane

Names of Text Books	Mathematics *Course 1*	Mathematics *Course 2*	Mathematics *Course 3*
Contents	p.338	4-3 Interpreting Graphs	3-3 Interpreting Graphs and Tables

Names of Text Books	Mathematics *Course 1*	Mathematics *Course 2*	Mathematics *Course 3*
Contents	11-9 Tables and Functions	4-4 Functions, Tables, and Graphs	3-4 Functions

Names of Text Books	Mathematics *Course 1*	Mathematics *Course 2*	Mathematics *Course 3*
Contents	1-7 Pattern and Sequences	4-5Problem Solving Skills: Find a Pattern in Sequences	3-6 Arithmetic Sequences 13-1 Terms of Arithmetic Sequences 13-2 Terms of Geometric Sequences

Names of Text Books	Mathematics *Course 1*	Mathematics *Course 2*	Mathematics *Course 3*
Contents	11-10 Graphing Functions	4-6 Graphing Linear Functions	3-4 Functions 12-1Graphing Linear Equations

Names of Text Books	Mathematics *Course 1*	Mathematics *Course 2*	Mathematics *Course 3*
Contents	None	Extension Nonlinear Functions	12-3 Using Slopes and Intercepts 13-5 Exponential Functions

Chapter 5 Proportional Relationships

Names of Text Books	Mathematics *Course 1*	Mathematics *Course 2*	Mathematics *Course 3*
Contents	7-1 Ratios and Rates	5-1 Ratios	5-1 Ratios and Proportions

Names of Text Books	Mathematics *Course 1*	Mathematics *Course 2*	Mathematics *Course 3*
Contents	7-1 Ratios and Rates	5-2 Rates	5-2 Ratios, Rates, and Unit Rates

Names of Text Books	Mathematics *Course 1*	Mathematics *Course 2*	Mathematics *Course 3*
Contents	None	5-3 Slope and Rates of Change	7-5 Coordinate Geometry

Names of Text Books	Mathematics *Course 1*	Mathematics *Course 2*	Mathematics *Course 3*
Contents	7-3 proportions	5-4 Identifying and Writing Proportions	5-1 Ratios, Rates, and Proportions

Names of Text Books	Mathematics *Course 1*	Mathematics *Course 2*	Mathematics *Course 3*
Contents	7-3 Proportions	5-5 Solving Proportions	5-4 Solving Proportions

Names of Text Books	Mathematics *Course 1*	Mathematics *Course 2*	Mathematics *Course 3*
Contents	9-1 Understanding Customary Units of Measure 9-3 Converting Customary	5-6 Customary Measurements	5-3 Dimensional Analysis P. 841

Names of Text Books	Mathematics *Course 1*	Mathematics *Course 2*	Mathematics *Course 3*
Contents	7-4 Similar Figures	5-7 Similar Figures and Proportions	7-1 Points, Lines, Planes, and Angles 7-2 Parallel and Perpendicular Lines

Names of Text Books	Mathematics *Course 1*	Mathematics *Course 2*	Mathematics *Course 3*
Contents	7-5 Indirect Measurement	5-8 Using Similar Figures	7-6 Congruence

Names of Text Books	Mathematics *Course 1*	Mathematics *Course 2*	Mathematics *Course 3*
Contents	7-6 Scale Drawing and Maps	5-9 Scale Drawing and Scale Models	5-5 Similarity and Scale

Names of Text Books	Mathematics *Course 1*	Mathematics *Course 2*	Mathematics *Course 3*
Contents	9-3 Converting Customary Units	Extension Dimensional Analysis	5-3 Dimensional Analysis

Chapter 6 Percents

Names of Text Books	Mathematics *Course 1*	Mathematics *Course 2*	Mathematics *Course 3*
Contents	7-7 Percents	6-1 Percents	6-1 Relating Decimal, Fractions and Percents

Names of Text Books	Mathematics *Course 1*	Mathematics *Course 2*	Mathematics *Course 3*
Contents	7-8 percents, Decimals, and Fractions	6-2 Fractions, Decimals, and Percents	6-1 Relating Decimal, Fractions and Percents

Names of Text Books	Mathematics *Course 1*	Mathematics *Course 2*	Mathematics *Course 3*
Contents	4-9 Estimating Fractions Sums and Difference	6-3 Problem Solving Skills: Estimate with Percents	6-2 Estimating with Percents

Names of Text Books	Mathematics *Course 1*	Mathematics *Course 2*	Mathematics *Course 3*
Contents	7-9 Percent Problems	6-4 Percents of a Number	6-3 Finding Percents

Names of Text Books	Mathematics *Course 1*	Mathematics *Course 2*	Mathematics *Course 3*
Contents	7-9 Percent Problems	6-5 Solving Percent Problems	6-3 Finding Percents 6-4 Finding a Number when the Percent is Known

Names of Text Books	Mathematics *Course 1*	Mathematics *Course 2*	Mathematics *Course 3*
Contents	7-10 Using Percents	6-6 Percent of Change	6-5 Percent Increase and Decrease

Names of Text Books	Mathematics *Course 1*	Mathematics *Course 2*	Mathematics *Course 3*
Contents	Extension, Chapter 7, p.400	6-7 Simple Interest	6-7 Simple Interest

Chapter 7 Collecting, Displaying and Analyzing Data

Names of Text Books	Mathematics *Course 1*	Mathematics *Course 2*	Mathematics *Course 3*
Contents	6-5 Line Plots, Frequency Tables, and Histograms 6-9 Stem-and-Leaf Plots	7-1Frequency Tables, Stem-and-leaf Plots, and Line Plots	9-5 Displaying Data p.835

Names of Text Books	Mathematics *Course 1*	Mathematics *Course 2*	Mathematics *Course 3*
Contents	6-2 Mean, Median, Mode, and Range 6-3 Additional Data and Outlier	7-2 Mean, Median, Mode, and Range	9-3 Measures of Central Tendency

Names of Text Books	Mathematics *Course 1*	Mathematics *Course 2*	Mathematics *Course 3*
Contents	6-4 Bar Graphs 6-5 Line Plots, Frequency Tables, and Histograms	7-3 Bar Graphs and Histograms	9-5 Display Data 9-8 Choosing the Best Representation of Data p.836

Names of Text Books	Mathematics *Course 1*	Mathematics *Course 2*	Mathematics *Course 3*
Contents	p.524	7-4 reading and Interpreting Circle Graphs	9-8 Choosing the Best Representation of Data p.484

Names of Text Books	Mathematics *Course 1*	Mathematics *Course 2*	Mathematics *Course 3*
Contents	p.790	7-5 Box-and-Whisker Plots	9-4 Variability

Names of Text Books	Mathematics *Course 1*	Mathematics *Course 2*	Mathematics *Course 3*
Contents	6-7 Line Graphs	7-6 Line Graphs	9-8 Choosing the Best Representation Data 12-1 Graphing Linear Equations

Names of Text Books	Mathematics *Course 1*	Mathematics *Course 2*	Mathematics *Course 3*
Contents	6-10 Choosing an Appropriate Display	7-7 Choosing an Appropriate Display	9-8 Choosing the Best Representation Data

Names of Text Books	Mathematics *Course 1*	Mathematics *Course 2*	Mathematics *Course 3*
Contents	None	7-8 Populations and Samples	9-1 Samples and Surveys

Names of Text Books	Mathematics *Course 1*	Mathematics *Course 2*	Mathematics *Course 3*
Contents	None	7-9 Scatter Plots	9-7 Scatter Plots

Names of Text Books	Mathematics *Course 1*	Mathematics *Course 2*	Mathematics *Course 3*
Contents	6-8 Misleading Graphs	7-10 Misleading Graphs	9-6 Misleading Graphing and Statistics

Chapter 8 Geometric Figures

Names of Text Books	Mathematics *Course 1*	Mathematics *Course 2*	Mathematics *Course 3*
Contents	8-1Building Blocks of Geometry	8-1Building Blocks of Geometry	7-1 Points, Lines, Planes, and Angles

Names of Text Books	Mathematics *Course 1*	Mathematics *Course 2*	Mathematics *Course 3*
Contents	8-2 Measuring and Classifying Angles 8-3 Angle Relationships	8-2 Classifying Angles	7-3 Angles in Triangles

Names of Text Books	Mathematics *Course 1*	Mathematics *Course 2*	Mathematics *Course 3*
Contents	8-3 Angle Relationships	8-3 Angle Relationships	7-2 Parallel and Perpendicular Lines

Names of Text Books	Mathematics *Course 1*	Mathematics *Course 2*	Mathematics *Course 3*
Contents	9-8 Circles and Circumference	8-4 Properties of Circles	8-3 Circles

Names of Text Books	Mathematics *Course 1*	Mathematics *Course 2*	Mathematics *Course 3*
Contents	8-7 Polygons	8-5 Classifying Polygons	7-4 Classifying Polygons

Names of Text Books	Mathematics *Course 1*	Mathematics *Course 2*	Mathematics *Course 3*
Contents	8-5 Triangles	8-6 Classifying Triangles	7-3 Angles in Triangles

Names of Text Books	Mathematics *Course 1*	Mathematics *Course 2*	Mathematics *Course 3*
Contents	8-6 Quadrilaterals	8-7 Classifying Quadrilaterals	7-4 Classifying Polygons

Names of Text Books	Mathematics *Course 1*	Mathematics *Course 2*	Mathematics *Course 3*
Contents	8-5 Triangles	8-8 Angles in Polygons	7-3 Angles in Triangles 7-4 Classifying Polygons

Names of Text Books	Mathematics *Course 1*	Mathematics *Course 2*	Mathematics *Course 3*
Contents	8-9 Congruence	8-9 Congruent Figures	7-6 Congruence

Names of Text Books	Mathematics *Course 1*	Mathematics *Course 2*	Mathematics *Course 3*
Contents	8-10 Transformation	8-10 Translations, Reflections, and Rotations	7-7 Transformation

Names of Text Books	Mathematics *Course 1*	Mathematics *Course 2*	Mathematics *Course 3*
Contents	8-11 Line Symmetry	8-11 Symmetry	7-8 Symmetry

Names of Text Books	Mathematics *Course 1*	Mathematics *Course 2*	Mathematics *Course 3*
Contents	None	Extension Dilations	5-6 Dilations

Chapter 9 Measurement: Two-Dimensional Figures

Names of Text Books	Mathematics *Course 1*	Mathematics *Course 2*	Mathematics *Course 3*
Contents	None	9-1Accuracy and Precision	p.844

Names of Text Books	Mathematics *Course 1*	Mathematics *Course 2*	Mathematics *Course 3*
Contents	9-7 Perimeter 9-8 Circles and Circumference	9-2 Perimeter and Circumference	8-2 Perimeter and Area of Triangles and Trapezoids 8-3 Circles

Names of Text Books	Mathematics *Course 1*	Mathematics *Course 2*	Mathematics *Course 3*
Contents	10-1 Estimating and Finding Areas	9-3 Area of Parallelograms	8-1 Perimeter and Area of Rectangles and Parallelograms

Names of Text Books	Mathematics *Course 1*	Mathematics *Course 2*	Mathematics *Course 3*
Contents	10-2 Area of Triangles and Trapezoids	9-4 Area of Triangles and Trapezoids	8-2 Perimeter and Area of Triangles and Trapezoids

Names of Text Books	Mathematics *Course 1*	Mathematics *Course 2*	Mathematics *Course 3*
Contents	10-5 Area of Circles	9-5 Area of Circles	8-3 Circles

Names of Text Books	Mathematics *Course 1*	Mathematics *Course 2*	Mathematics *Course 3*
Contents	10-3 Area of Composite Figures	9-6 Area of Irregular Figures	8-1 Perimeter and Area of Rectangles and Parallelograms

Names of Text Books	Mathematics *Course 1*	Mathematics *Course 2*	Mathematics *Course 3*
Contents	None	9-7 Squares and Square Roots	4-5 Squares and Square Roots

Names of Text Books	Mathematics *Course 1*	Mathematics *Course 2*	Mathematics *Course 3*
Contents	None	9-8 The Pythagorean Theorem	4-8 The Pythagorean Theorem

Names of Text Books	Mathematics *Course 1*	Mathematics *Course 2*	Mathematics *Course 3*
Contents	None	Extension Identifying an Graphing Irrational Numbers	2-1 Rational Numbers 4-7The Real Numbers

Chapter 10 Measurement: Three-Dimensional Figures

Names of Text Books	Mathematics *Course 1*	Mathematics *Course 2*	Mathematics *Course 3*
Contents	10-6 Three-Dimensional Figures	10-1 Introduction to Three-Dimensional Figures	8-4Drawing Three-Dimensional Figures

Names of Text Books	Mathematics *Course 1*	Mathematics *Course 2*	Mathematics *Course 3*
Contents	10-7 Volume of Prisms 10-8 Volume of Cylinders	10-2 Volume of Prism and Cylinders	8-5 Volume of Prisms and Cylinders

Names of Text Books	Mathematics *Course 1*	Mathematics *Course 2*	Mathematics *Course 3*
Contents	None	10-3 Volume of Pyramids and Cones	8-6 Volume of Pyramids and Cones

Names of Text Books	Mathematics *Course 1*	Mathematics *Course 2*	Mathematics *Course 3*
Contents	10-9 Surface Area	10-4 Surface Area of Prism and Cylinders	8-7 Surface Area of Prisms and Cylinder

Names of Text Books	Mathematics *Course 1*	Mathematics *Course 2*	Mathematics *Course 3*
Contents	10-4 Comparing Perimeter and Area	10-5 Changing Dimensions	8-8 Surface Area of Pyramids and Cones

Names of Text Books	Mathematics *Course 1*	Mathematics *Course 2*	Mathematics *Course 3*
Contents	None	Extension: Cross Sections	Extension: Symmetry in Three-Dimension, p.446

Chapter 11 Probability

Names of Text Books	Mathematics *Course 1*	Mathematics *Course 2*	Mathematics *Course 3*
Contents	12-1 Introduction to Probability 12-6 Making Predication	11-1 Probability	10-1 Probability

Names of Text Books	Mathematics *Course 1*	Mathematics *Course 2*	Mathematics *Course 3*
Contents	12-2 Experimental Probability	11-2 Experimental Probability	10-3 Use a Simulation

Names of Text Books	Mathematics *Course 1*	Mathematics *Course 2*	Mathematics *Course 3*
Contents	12-3 counting Methods and Sample Space	11-3 Problem Solving Skills: Make a List to Find Sample Spaces	10-8 Counting Principles

Names of Text Books	Mathematics *Course 1*	Mathematics *Course 2*	Mathematics *Course 3*
Contents	12-4 Theoretical Probability	11-4 Theoretical Probability	10-4 Theoretical Probability

Names of Text Books	Mathematics *Course 1*	Mathematics *Course 2*	Mathematics *Course 3*
Contents	12-5 Compound Events	11-5 Probability of Independent and Dependent Events	10-5 Independent and Dependent Events

Names of Text Books	Mathematics *Course 1*	Mathematics *Course 2*	Mathematics *Course 3*
Contents	pp.692-693	11-6 Combinations	10-9 Permutations and Combinations

Names of Text Books	Mathematics *Course 1*	Mathematics *Course 2*	Mathematics *Course 3*
Contents	pp.692-693	11-7 Permutations	10-9 Permutations and Combinations

Chapter 12 Multi-Step Equations and Inequalities

Names of Text Books	Mathematics *Course 1*	Mathematics *Course 2*	Mathematics *Course 3*
Contents	2-7 Multiplication Equation 2-8 Division Equation 11-8 Solving Integers Equation	12-1Solving Two-Step Equations Using Division	11-2 Solving Multi-Step Equations

Names of Text Books	Mathematics *Course 1*	Mathematics *Course 2*	Mathematics *Course 3*
Contents	p.762	12-2 Solving Multi-Step Equations	11-2 Solving Multi-Step Equations

Names of Text Books	Mathematics *Course 1*	Mathematics *Course 2*	Mathematics *Course 3*
Contents	None	12-3 Solving Equations with Variables on Both Sides	11-3 Solving Equations with Variables on Both Sides

Names of Text Books	Mathematics *Course 1*	Mathematics *Course 2*	Mathematics *Course 3*
Contents	Extension, Chapter 2	12-4 Inequalities	11-4 Solving Inequalities by Multiplying or Dividing 11-5 Solving Two-Step Inequalities

Names of Text Books	Mathematics *Course 1*	Mathematics *Course 2*	Mathematics *Course 3*
Contents	None	12-5 Solving Inequalities by Adding or Subtracting	11-5 Solving Two-Step Inequalities

Names of Text Books	Mathematics *Course 1*	Mathematics *Course 2*	Mathematics *Course 3*
Contents	None	12-6 Solving Inequalities by Multiplying or Dividing	11-4 Solving Inequalities by Multiplying or Dividing

Names of Text Books	Mathematics *Course 1*	Mathematics *Course 2*	Mathematics *Course 3*
Contents	None	12-7 Solving Two-Step Inequalities	11-5 Solving Two-Step Inequalities

G. Mathematics *Course 3*

In *Course 3* Mathematics Textbook, there were 14 chapters which contained 111 sections including 3 extension sections. Mathematics *Course 3* had 912 pages long. Systematical analyses were made of every section in each chapter to find whether or not the contents were "a mile wide and an inch deep." Great details were also indicated in Table 3B (on page 166). From Table 3B, many of contents were seen being repeated or overlapped in each grade. The writer did not type all of the examples or explanation that was shown to be repeated or re-taught in the following statement. Table 3B was clearly shown which content was to be taught or to be re-taught, *etc*. It was found that about 20% of the contents were new. *Course 3* was intended for 8th graders. Unfortunately, many contents were re-taught in 8th grade instead of being revisited. Some of typical examples of repetition or overlapping were stated in the following. For example:

In *Course 3*:

1-1 Variables and Expressions

Vocabulary *variable coefficient algebraic expression constant evaluate substitute*

Example 1 Evaluating Algebraic Expressions with One Variable

D) $x + 5$ for $x = 11$

E) $2a + 3$ for $a = 4$

F) $4(3 + n) -2$ for $n = 0, 1, 2$

Example 2 Evaluating Algebraic Expressions with Two Variables

B) $5x + 2y$ for $x = 13$ and $y = 11$

C) $2.5p – 4q$ for p 12 and $q = 6.5$

This section was also introduced in 2-1 of *Course 1* and 1-7 of *Course 2*. Unfortunately, it was found that negative integers were not introduced. The book was intended for 8th graders who already learned integers. Why did the compilers not make examples with negative integers?

In *Course 1*:

2-1 Variables and Expressions

Vocabulary *variable constant algebraic expression*

Example 1 Evaluating Algebraic Expressions

$w \div 3$ when $w = 55$, $4 \times n + 6^2$

Example 2 Evaluating Expressions with Two Variables

$l \times w$ for $l = 4$ and $w = 2$

In *Course 2*:

1-7 Variables and Algebraic Expressions

Vocabulary *variable constant algebraic expression evaluate*

Example 1 Evaluating Algebraic Expressions

Evaluate $n + 7$ for each value of n.

C) $n = 3$ $n + 7$ $3 + 7 = 10$

Example 2 Evaluating Algebraic Expressions Involving Order of Operations

G) $3x - 2$ for $x = 5$ $3(5) - 2$ $15 - 2 = 13$

H) $n \div 2 + n$ for $n = 4$ $4 \div 2 + 4$ $2 + 4 = 6$

I) $6y^2 + 2y$ for $y = 2$ $6(2)^2 - 2(2)$ $6(4) + 2(2)$ $24 + 4 = 28$

Example 3 Evaluate $\frac{3}{n} + 2m$ for n = 3 and m = 4. $\frac{3}{3} + 2(4)$ $1 + 8 = 9$

Amazingly, *Variables and Expressions*, and *Equations and Their Solutions* were taught and re-taught from *Course 1* through *Course 3* as shown in Table 1B (on page 44), Table 2B (on page 108), and Table 3B (page 166). Since students learned variables and algebraic expressions in 2-1 of *Course 1* before, why weren't there any examples involved in using integers in algebraic expressions in Chapter 11 of *Course 1*? Moreover, "Adding Integers" was repeated in 11-4 of *Course 1*, 2-2 of *Course 2*, and 1-4 of *Course 3*. "Subtracting Integers" was repeated in 11-5 of *Course 1*, 2-3 of Course, and 1-5 of *Course 3*. "Multiplying Integers" was repeated in 11-6 of *Course 1*, 2-4 of *Course 2*, and 1-6 of *Course 3*. "Multiplication Equations" was repeated in 2-7 of *Course 1*, 1-12 of *Course 2*, and 1-8 of *Course 3*, *etc*. From Table 3B, there were a lot of content areas repeated or overlapped. *Course 3* was intended for 8th graders. Some of the contents were taught in previous grades as seen from Table 3B on page 166.

H. Table 3A

(Mathematics *Course 3*)

Table 3A showed Mathematics *Course 3* Textbook, where there were 14 chapters which contained 111 sections including 3 extension sections. Mathematics *Course 3* had 912 pages long. The writer didn't copy all the examples or explanation from each section. Additional comments were also made on some sections or chapters. The writer gave a *Note* at the end of some sections in a chapter.

Chapter 1
Principles of Algebra

Chapter 1 had 9 sections. It dealt with principles of algebra.

1-2 Variables and Expressions

Vocabulary *variable coefficient algebraic expression constant evaluate substitute*

Example 1 Evaluating Algebraic Expressions with One Variable
- G) x + 5 for x = 11
- H) 2a + 3 for a = 4
- I) 4(3 + n) -2 for n = 0, 1, 2

Example 2 Evaluating Algebraic Expressions with Two Variables
- D) 5x + 2y for x = 13 and y = 11
- E) 2.5p – 4q for p 12 and q = 6.5

Note: This section was also introduced in 2-1 of *Course 1* and 1-7 of *Course 2*. Unfortunately, it was found that negative integers were not introduced. The math book was intended for 8th graders who already learned integers. Why did the compilers not make examples with negative integers?

1-3 Algebraic Expressions

Example 1 Translating Word Phrases into Math Expressions
Example 2 Translating Math Expression into word Phrases

Example 3 Writing and Evaluating Expressions in word Problems
Example 4 Writing a word Problem from a Math Expression

Note: This section was also stated in 2-1 of *Course 1* and 1-7 of Course. In this section a table of addition, subtraction, multiplication and division was constructed regarding word phrases and expression. That would help students review what they learned from previous grades.

1-4 Integers and Absolute Value

Vocabulary *integer* *opposite* *additive inverse* *absolute value*

Example 1 Sports Application
A) Use <, > or = to compare Trevor's and Julie's scores
Trevor's score is 3, and Julie's score is -2.
B) List the golfers in order from the lowest score to the highest.
The score are -5, 3, 4, and -2.

Example 2 Ordering Integers
Write the integers 7, -4, and 3 in order form least to greatest.

Example 3 finding Additive Inverse
Find the additive inverse of each integer.
A) $8 \rightarrow -8$ B) $-15 \rightarrow 15$ C) $0 \rightarrow 0$
B)

Example 4 Evaluating Absolute-Value Expressions
A) $|-9| + |7| \rightarrow |-9| = 9 \quad |7| = 7 \quad \rightarrow 9 + 7 = 16$
B)

Note: This section was also stated on page 762 of *Course 1* an in 2-1 in *Course 2*.

1-5 Adding Integers

Example 1 Using a Number Line to Add Integers
Use a number line to find each sum.
A) $3 + (-7)$ B) $-2 + (-5)$

Example 2 Using Absolute Value to Add Integers
A) $-4 + (-6)$ B) $8 + (-8)$ C) $-5 + 11$

Example 3 Evaluating Expressions with Integers
Evaluate $b + 11$ for $b = -6$

Note: This section was also introduced in 11-4 of *Course 1*, 2-1 and 2-4 of *Course 2*.

1-6 Subtracting Integers

Example 1 Subtracting Integers

A) – 7 – 7 B) 2 – (-4) C) -13 – (-5)

Example 2 Evaluating Expressions with Integers

Evaluate each expression for the given value of the variable.

A) 6 - t for t = -4 B) – 4 – s for s = -9 C) -3 –x for x =5

Note: This section was also introduced in 11-5 of *Course 1* and 2-3 of *Course 2*.

1-7 Multiplying and Dividing Integers

Example 1 Multiplying and Dividing Inters

A) 5(-8) B) $\frac{-45}{9}$ C) 12(-3) D) $\frac{32}{-8}$

Example 2 Using the Order of Operations with Integers

Simplify.

A) -3(2-8) B) 5 (-7-2) C) -2(14-6)

Note: This section was also introduced in 11-6 and 11-7 of *Course 1* and 2-4 of *Course 2*.

1-8 Solving Equations by Adding or Subtracting

Vocabulary *equation inverse operation*

Example 1 Determining Whether a Number Is a Solution of an Equation.

Determine whether Value of x is a solution of the equation.

x – 7 = 13; x = 12 or 20

Substitute each value for x in the equation.

Example 2 Solving Equations Using Addition and subtraction Properties.

Solve.

A) 6 + t = 28 B) m – 8 = -14 C) 15 = w + (-14)

Example 3 Problem solving Application

Note: This section was also introduced in 2-5, 2-6 of *Course 1* and 1-11 of *Course 2*.

1-9 Solving Equations by Multiplying or Dividing

Example 1Solving Equation Using division

Solve and check.

A) 8x = 32 B) -7y = -91

Example 2 solving Equations Using Multiplication

Solve $\frac{h}{-3} = 6$.

Example 3 Money Application

Example 4 Solving a Simple Tw0-Step Equation

Solve 2x + 1 = 7

Note: This section was also stated in 2-7 and 2-8 of *Course 1* and 1-12 of *Course 2*.

1-10 Introduction to Inequalities

Vocabulary *inequality algebraic inequality solution set*

<	>	≤	≥
is less than	*is greater than*	*is less than or equal to*	*is greater than or equal to*

Example 1 Completing an Inequality

Compare. Write < or >.

A) 13 – 9 ___ 6 B) 2(8) ____ 10

(Note: There is a good table shown for the set of all solution.)

Example 2 Solving and Graphing Inequalities

A) x + 7 < -10 B) t – 11 ≤ -3 C) z + 6 ≥ -3

Note: This section was also stated in an extension section of Chapter 2 of *Course 1*, 12-4, 12-5, 12-6, and 12-7 of *Course 2*.

Chapter 2
Rational Numbers

Chapter 2 had 8 sections. It dealt with rational numbers.

2-1 Rational Numbers

Vocabulary *rational number relatively prime*

Example 1 Simplifying Fractions

Simply.

A) $\frac{9}{55}$ B) $\frac{-24}{32}$

Example 2 Writing Decimals as Fractions

Example 3 Writing Fractions as Decimals

Note: This section was also introduced in 2-11 of *Course 2*.

2-2 Comparing and Ordering Rational Numbers

Vocabulary *least common denominator* (LCD)

Example 1 Comparing Fractions by Finding a Common Denominator
Compare. Write <, >, or =
Example 2 Comparing by Using Decimals
Compare. Write <, >, or =

Note: This section was also introduced in 4-7 of *Course 1*, 2-11 of *Course 2*. Examples of negative fractions and decimals were added to this section.

2-3 Adding and Subtracting Rational Numbers

Example 2 Using a Number Line to Add Rational Numbers
A) -0.4 + 1.3 B) $-\frac{7}{8} + (-\frac{3}{8})$
Example 3 Adding and Subtracting Fractions with Like Denominator

Note: This section was also introduced in 4-8 of *Course 1*, 3-7, 3-8 and 3-9 of *Course 2*. Negative fractions were added to this section.

2-4 Multiplying Rational Numbers

Example 1 Multiplying a Fraction and an Integer
Example 2 Multiplying Fractions
Example 3 Multiplying Decimals

Note: This section was also introduced in 5-8 of *Course 1* and 3-10 of *Course 2*. Negative fractions and decimals were added to this section.

2-5 Dividing Rational Numbers

Vocabulary *reciprocal*

Example 1 dividing Fractions
Example 2 Dividing Decimals
Example 3 Evaluating Expressions with Fractions and Decimals
A) $\frac{7.2}{n}$ for n = -0.24B) m $\div \frac{5}{2.4}$ for m = $3\frac{3}{4}$

Note: This section was also introduced in 5-9 of *Course 1* and 3-11 of *Course 2*. Negative fractions and decimals were introduced to this section.

2-6 Adding and Subtracting with Unlike Denominators

Example 1 Adding and Subtracting Fractions with Unlike Denominators
Example 2 Evaluating Expressions with Rational Numbers
Evaluate $n - \frac{11}{16}$ for $n = -\frac{1}{3}$

Note: This section was also introduced in 5-3, 5-4 of *Course 1* and 3-12 of *Course 2*. Negative numbers were added to it.

2-7 Solving Equations with Rational Numbers

Example 1 Solving Equations with Decimals
A) $y - 17.5 = 11$ B) $-4.2p = 12.6$ C) $\frac{t}{7.5} = 4$
Example 2 Solving Equations with Fractions
A) $x + \frac{1}{3} = -\frac{4}{9}$ B) $x - \frac{1}{8} = \frac{9}{16}$ C) $\frac{3}{5}w = \frac{3}{16}$
Example 3 Solving Word Problems Using Equations

Note: This section was also stated in 2-5, 2-6 of *Course 1* and 3-6 of *Course 2*. Negative numbers were added to it.

2-8 Solving Two-Step Equations

Example1 Problem solving Application
Example 2 Solving Two-Step Equations
$\frac{r+7}{4} = 5$

Note: This section was also introduced in 2-8 of *Course 1*, 2-5 and 12-1 of *Course 2*. Students had trouble in solving two –step equations.

Chapter 3
Graphs, Functions, and Sequences

Chapter 3 dealt with functions and sequences. It had 6 sections in it.

3-1 Ordered Pairs

Vocabulary *ordered pair*

Example 1 Deciding whether an Ordered pair Is a Solution of an Equation
Determine whether each ordered pair is a solution of $y + 3x + 2$.
A) $(2, 5) \rightarrow$ is not a solution. B) $(3, 11) \rightarrow$ is a solution.

Example 2 Creating a Table of Ordered pair Solutions
Use the given values to make a table of solutions.

Note: This section was also stated in 11-10 of *Course 1* and 4-4 of *Course 2*.

3-2 Graphing on a Coordinate Plane

Vocabulary *coordinate plane x-axis y-axis quadrant x-coordinate y-coordinate origin graph of an equation*

Example 1 Finding the Coordinate and Quadrants of Points on a Plane
Example 2 Graphing Points on a Coordinate Plane
Example 3 Graphing an Equation of a Line

Note: This section was also stated in 6-6 and 11-3 of *Course 1*, 14-1 and 4-2 of *Course 2*.

3-3 Interpreting Graphs and Tables

Example 1 Matching situations to Tables
Example 2 Matching situations to Graphs
Example 3 Creating a Graphing of a Situation

Note: This was also introduced in 4-3 of *Course 2*.

3-4 Functions

Vocabulary *function input output domain range vertical line*

Example 1 Finding Different Representations of a Function
Make a table and a graph of $y = 2x + 1$
Example 2 Identifying Functions

Note: This section was also introduced in 11-9 of *Course 1* and 4-4 of *Course 2*.

3-5 Equations, Tables, and Graphs

Example 1 Using Equations to Generate Different Representations of Data
Example 2 Using Tables to Generate different Representations of Data
Example 3 Using Graphs to Generate Different Representations of Data

Note: This section was also introduced in 11-10 of *Course 1* and 4-5 of *Course 2*. In this section data was used to make a table or graph. Students had trouble in this part.

3-6 Arithmetic Sequences

Vocabulary *sequence term arithmetical sequence common difference*

Example 1 Finding the Common Difference in an Arithmetic Sequence
Example 2 Finding Missing Terms in an Arithmetic Sequence
Example 3 Identifying functions in Arithmetic Sequences
Example 4 Travel application

Note: This section was also stated in 1-7 of *Course 1* and 4-5 of *Course 2*. The compiler should have added the formula $a_n = a_1 + (n-1)d$ for arithmetical sequence here. 13- 2 (Terms of Geometric Sequences) of *Course 3* should be moved here, because arithmetical sequences and geometric sequences were mentioned before in *Course 1* and *Course 2*. They should be put together.

Chapter 4
Exponents and Roots

Chapter 4 dealt with exponents and roots. There were 8 sections in it.

4-1 Exponents

Vocabulary *exponential form exponent base power*

Example 1 Writing Exponents

D) $5 \cdot 5 \cdot 5 \cdot 5 \cdot 5 \cdot 5 \cdot 5 = 5^7$
E) $(-4) \cdot (-4) \cdot (-4) = (-4)^3$
F) $8 \cdot 8 \cdot 8 \cdot 8 \cdot p \cdot p \cdot p = 8^4p^3$

Example 2 Evaluating Power

B) 3^4 B) 12^2 C) $(-8)^3$ D) -2^3

Example 3 Using the Order of Operations

Evaluate $x - y(z \cdot y^z)$ for $x = 20$, $y = 4$, and $z = 2$

Example 4 Geometry Application

The number of diagonal of a n-sided figure is $\frac{1}{2}(n^2 - 3n)$. Use the formula to find the number of diagonals for a 6-sided figure.

$\frac{1}{2}(n^2 - 3n) \rightarrow \frac{1}{2}(6^2 - 3 \cdot 6) \rightarrow \frac{1}{2}(36 - 18) = 9$

Note: This section was also stated in 1-3 of *Course 1* and 1-2 of *Course 2*.

4-2 Look for a Pattern in Integers Exponents

Example 1 Using a Pattern to Evaluate Negative Exponents

A) 10^{-4}

Example 2 Evaluating Negative Exponents

A) $(-2)^{-3}$ B) 6^{-4}

Example 3 Using the Order of Operations

Evaluate $2 + (-7)^0 - (4+ 2)^{-2} \rightarrow 2 + (-7)^0 - 6^{-2} = 2 + 1 - \frac{1}{36} = 2\frac{35}{36}$

Note: This section was also mentioned in the extension section of Chapter 2 in *Course 2*.

4-3 Properties of Exponents

Example 1 Multiplying Powers with the Same Base

A) $5^4 \cdot 5^3 = 5^{4+3} = 5^7$ C) $16 \cdot 16^{-7} = 16^{1+-7} = 16^{-6}$

Example 2 Dividing Powers with the Same Base

A) $\frac{10^8}{10^5} = 10^{8-5} = 10^3$

Example 3 Raising a Power to a Power

A) $(7^5)^3 = 7^{5 \cdot 3} = 7^{15}$ C) $(2^{-7})^{-2} = 2^{-7 \cdot (-2)} = 7^{14}$ D) $(12^{10})^{-6} = 12^{10 \cdot (-6)} = 12^{-60}$

Note: This section was new to students. How to multiply and divide powers with the same bases was introduced. How to raise a power to a power was also introduced.

4-4 Scientific Notation

Vocabulary *scientific notation*

Example 1 Translating Scientific Notations to Standard Notation

Write each number in standard notation.

A) $3.12 \times 10^{9} = 3{,}120{,}000{,}000$

B) $4.7 \times 10^{-4} = 4.7 \times \frac{1}{10{,}000} = 0.00047$

Example 2 Translating Standard Notation to Scientific Notation

Write 0.0000003 in scientific notation

3×10^{-7}

Note: This section was also introduced in 3-4 of *Course 1*. Negative exponents were also mentioned in the extension section of Chapter 11 in *Course 1*, 1-4 and the extension section of Chapter 2 in *Course 2*.

4-5 Squares and Square Roots

Vocabulary *principal square root perfect square*

Example 1 Finding the Positive and Negative Square Roots of a Number

A) $81 \rightarrow \sqrt{81} = 9 \quad -\sqrt{81} = -9$

Example 2 Computer Application

Example 3 Evaluating Expressions Involving Square Roots

Evaluate each expression.

A) $3\sqrt{25} + 4 = 3(5) + 4 = 15 + 4 = 19$

B) $\sqrt{\frac{16}{4}} + \frac{1}{2} = \sqrt{4} + \frac{1}{2} = 2 + \frac{1}{2} = 2\frac{1}{2}$

Note: This section was also mentioned in 9-7 of *Course 2*.

4-6 Estimating Square Roots

Example 1 Estimating Square Roots of Numbers

Example 2 Problem Solving Application

Example 3 Using a Calculator to Estimate the Value of a Square Root

Note: This section was also introduced in 9-7 of *Course 2*.

4-7 The Real Numbers

Vocabulary *irrational number* *real number* *density property*

Example 1 Classifying Real Numbers
Example 2 Determining the Classification of All Numbers
A) $\sqrt{15}$ irrational B) $\frac{3}{0}$ undefined, so not a real number
B) $\sqrt{\frac{1}{9}}$ rational D) $\sqrt{-13}$ not a real number
Example 3 Applying the Density Property of Real Numbers

Note: This section was also introduced in 2-11 of *Course 2*. What was introduced in *Course 1* and *Course 2* were also put together here.

4-8 The Pythagorean Theorem

Vocabulary *Pythagorean Theorem* *leg* *hypotenuse*

Example 1 Finding the Length of a Hypotenuse
Example 2 Finding the Length of a Leg in a Right Triangle
Example 3 Using the Pythagorean Theorem for Measurement

Chapter 5
Ratios, Proportions, and Similarity

Chapter 5 dealt with proportions and similarity. There were 8 sections in it.

5-1 Ratios and Proportions

Vocabulary *ratio* *equivalent ratio* *proportion*

Example 1 Finding Equivalent Ratio
Example 2 Determine Whether Two Ratios Are in Proportion

Note: This section was also introduced in 7-1 of *Course 1* and 5-1 of *Course 2*. The compilers did not show another way (in the example) to determine whether two ratios were in proportion just by using cross product when Example 2 above was introduced.

5-2 Ratios, Rates, and Unit Rates

Vocabulary *rate unit rate unit price*

Example 1 Finding Unit Rates

$\frac{120 \text{ words}}{3 \text{ minutes}} = \frac{40 \text{ words}}{1 \text{ minute}}$ Mike can type 40 words in one minute.

Example 3 Estimating Unit Rates

Example 4 Finding Unit Prices to Compare Costs

Note: This section was also introduced in 7-1 and 7-2 of Course, and 5-2 of *Course 2*.

5-3 Dimensional Analysis

Vocabulary *conversion factor*

$\frac{1 \text{ ft}}{12 \text{ in.}} = \frac{12 \text{ in.}}{12 \text{ in.}} = 1$

Example 1 Finding Conversion Factor

A) Ounces to pounds $\frac{1 \text{ lb}}{16 \text{ oz}}$ B) Kilometers to meters $\frac{1000\text{m}}{1 \text{ km}}$

Example 2 Using Conversion Factors to Solve Problems

$\frac{22 \text{ gal}}{1 \text{ yr}} \cdot \frac{4\text{qt}}{1 \text{ gal}} = 88$ qt per year

Example 3 Problem Solving Application

Note: This section was also introduced 9-1 and 9-3 of *Course 1*, and 5-6 of *Course 2*. It was also stated in the extension section of Chapter 5 in *Course 2*.

5-4 Solving Proportion

Vocabulary *cross product*

Example 1 Using Cross Products to Identify Proportions

Example 2 Solving Proportions Using Unit Price

Example 3 Solving Proportions Using Equivalent Fractions

Example 4 Business Application

Example 5 Physical Science Application

Note: This section was also introduced in 7-3 of *Course 1* and 5-5 of *Course 2*.

5-5 Similarity and Scale

Vocabulary *similar congruent angles scale factor*

Example 1 Identifying Similar Figures
Example 2 using Scale Factors to Find Missing Dimensions

Note: This section was also introduced in 7-5 and 7-6 of *Course 1* and 5-7, 5-8, and 5-9 of *Course 2*.

5-6 Dilations

Vocabulary *dilation center of dilation*

Example 1 Identifying Dilations
Example 2 Dilating a Figure
Example 3 Using the Origin as the Center of Dilation

Note: This section was also introduced in 7-6 of *Course 1* regarding scale drawings. It was also mentioned in the extension section of Chapter 8 in *Course 2*.

5-7 Indirect Measurement

Vocabulary *indirect measurement*

Example 1 Geography Application
Example 2 Problem Solving Application

Note: This section was also mentioned in 7-3 of *Course 1* and 5-5 and 5-4 of *Course 2*. That could be introduced in "Proportion Sections."

5-8 Scale Drawings and Scale Models

Vocabulary *scale drawing scale scale model reduction enlargement*

Example 1 Using Proportions to Find Unknown Scales.
Example 2 Life Science Application
Example 3 Finding Unknown Dimensions Given Scale Factors
Example 4 Life Science Application

Note: This section was also introduced in 7-6 of *Course 1* and 5-9 of *Course 2*.

Chapter 6
Percents

Chapter 6 dealt with percents. There were 7 sections in it.

6-1 Relating Decimals, Fractions and Percents

Vocabulary *percent*

Example 1 Finding Equivalent Ratios and Percents

$25\% = \frac{25}{100} = \frac{1}{4}$ $1\frac{1}{5} = 1.2 = 120\%$ $66\frac{2}{3}\% = 0.66\overline{6} = \frac{2}{3}$

Example 2 Comparing Fractions, Decimals, and Percents

Compare. Write <, >, or =

Example 3 Ordering Fractions, Decimals, and Percents

Example 4 Physical Science Application

Note: This section was also introduced in 3-1, 4-4, 4-7, and 7-8 of *Course 1* and 2-11 of *Course 2*.

6-2 Estimate with Percents

Vocabulary *estimate* *compatible numbers* *benchmark*

Example 1 Estimating with Percents

A) 24% of 44 $\rightarrow$ $24\% \approx 25\% \approx \frac{1}{4}$ $\frac{1}{4} \cdot 44 = 11$ 24% of 44 is about 11.

B) 36% of 20 $\rightarrow$ $36\% \approx 35\% \approx 25\% + 10\%$

$\rightarrow 35\% \cdot 20 = (25\% + 10\%) \cdot 20 = 5 + 2$ 36% of 20 is about 7.

Note: This section was also introduced in 4-9 of *Course 1* and 6-3 of *Course 2*.

6-3 Finding Percents

Example 1 Finding the Percent One Number Is of Another

What percent of 144 is 64?

Example 3 Finding the Percent of a Number

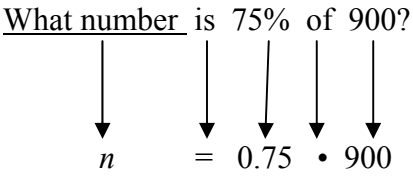
Note: This section was also introduced in 7-9 of *Course 1* and 6-4 of *Course 2*. The compiler should add the formula $\frac{is}{of} = \frac{\%}{100}$ to the section.

6-4 Finding a Number when the Percent is Known

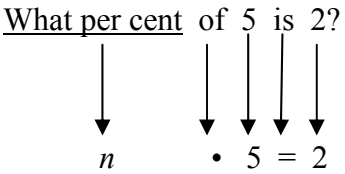
Example 1 Finding a Number When the Percent is Known
42 is 5% of what number? → 42 = 5% · n

Note: This section was also introduced in 7-9 of *Course 1* and 6-5 of *Course 2*. The compilers should add the following. For example:

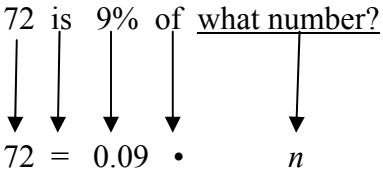
Finding a Per Cent of a Number



Finding What Per Cent a Number is of Another?



Finding a Number Given is Per Cent



Note: These three types of per cent problems were essential to those students who were confused with the formula $\frac{\text{is}}{\text{of}} = \frac{\%}{100}$, because some students did not know how to set up an equation with the formula $\frac{\text{is}}{\text{of}} = \frac{\%}{100}$. The writer found that students were confused with the "is" or "of" in the formula $\frac{\text{is}}{\text{of}} = \frac{\%}{100}$. These three types of solving percent problems could help some students overcome the difficulty using the formula $\frac{\text{is}}{\text{of}} = \frac{\%}{100}$.

6-5 Percent Increase and Decrease

Vocabulary *percent change* *percent increase* *percent decrease*

Example 1 Finding Percent Increase or Decrease

$45 - 36 = 9$

$\frac{\text{amount of increase}}{\text{original amount}} \rightarrow \frac{9}{36} = 0.25 = 25\%$

From 36 to 45 is a 25% increase.

Example 3 Using Percent Increase or Decrease to Find Prices

Note: This section was also introduced in 7-10 of *Course 1* and 6-6 of *Course 2*.

6-6 Applications of Percents

Vocabulary *commission* *rate* *sales tax*

Example 1 Multiplying by Percents to Find Commission Amounts
Example 2 Multiplying by Percents to Find Sales Tax Amounts
Example 3 Using Proportions to Find the Percent of Earnings
Example 4 Dividing by Percents to Find Total Sales

Note: This section was also introduced in 7-10 of *Course 1* and 6-6 of *Course 2*.

6-7 Simple Interest

Vocabulary *interest* *simple interest* *principal* *rate of interest*

Formula: $I = p \cdot r \cdot t$

I = simple interest p = principal r = rate of interest t = time

Example 1 Finding Interest and total Payment on a Loan
Example 2 Determining the Amount of Investment Time
Example 3 Computer Total Savings
Example 4 Finding the Rate of Interest

Note: This section was also introduced in the extension section of Chapter 1 in *Course 1* and 6-7 of *Course 2*.

Chapter 7

Foundations of Geometry

Chapter 7 dealt with foundations of geometry. There were 9 sections in it.

7-1 points, Lines, Planes, and Angles

Vocabulary *point line plane segment ray angle right angle acute angle obtuse angle complementary angles supplementary angles congruent angles vertical angles*

Example 1 Naming Points, Lines, Planes, Segments, and Rays
Example 2 Classifying Angles
Example 3 Finding the Measures of Vertical Angles

Note: This section was also introduced in 8-1 of *Course 1* and 8-1 of *Course 2*.

7-2 Parallel and Perpendicular Lines

Vocabulary *parallel lines perpendicular lines transversal*

Example 1 Identifying Congruent Angles formed by a Transversal
Corresponding angles, alternate interior angles, alternate exterior angles

Example 2 Finding Angle Measures of Parallel Lines cut by Transversals

Note: This section was also introduced in 8-4 of *Course 1* and 8-3 of *Course 2*.

7-3 Angles in Triangles

Vocabulary *Triangle Sum Theorem acute triangle right triangle obtuse triangle equilateral triangle isosceles triangle scalene triangle*

Example 1 Finding Angles in Actual, right, and Obtuse Triangles

A) Find x^0 in the acute triangle.
$63^0 + 42^0 + x^0 = 180^0$

Example 2 Finding Angles in Equilateral, isosceles, and Scalene Triangles
Example 3 Finding Angles in a Triangle That Meets Given Conditions

Note: This section was also introduced in 8-2, 8-3, and 8-5 of *Course 1* and 8-3 of *Course 2*.

7-4 Classifying Polygons

Vocabulary *polygon regular polygon trapezoid parallelogram rectangle rhombus square*

Example 1 Finding Sums of the Angle Measures in Polygons
A) Find the sum of a the angle measures in each figure
Divide the sum of the angle measures in a quadrilateral.

Example 2 Finding the Measure of Each Angle in a Regular Polygon
Example 3 Classifying Quadrilaterals

Note: Example A above was a good example because it showed how to find the angle measures. However, this section was also introduced in 8-6 and 8-7 of *Course 1*, and 8-5, 8-6, 8-7, and 8-8 of *Course 2*.

7-5 Coordinate Geometry

Vocabulary *slope rise run*

$$\text{slope} = \frac{\text{vertical change}}{\text{horizontal change}} = \frac{\text{rise}}{\text{run}}$$

Example 1 Finding the Slope of a Line
Example 2 Finding Perpendicular and Parallel Lines
Example 3 Using Coordinates to classifying Quadrilaterals
Example 4 Finding the Coordinates of a Missing Vertex

Note: This section was also introduced in 5-3 of *Course 2*.

7-6 Congruence

Vocabulary *correspondence*

Example 1 Writing Congruence Statements
Example 2 Using Congruence Relationships to Find Unknown Values

Note: This section was also introduced in 8-9 of *Course 1* and 8-9 of *Course 2*.

7-7 Transformation

Vocabulary *transformation translation rotation center of rotation reflection image*

Example 1 Identifying Transformation
Example 2 Graphing Transformations
Example 3 Describing Graphing of Transformation

Note: This section was also introduced in 8-10 of *Course 1* and 8-10 of *Course 2*.

7-8 Symmetry

Vocabulary *line symmetry line of symmetry rotational symmetry*

Example 1 Drawing Figures with Line symmetry
Example 2 Drawing Figures with Rotational Symmetry

Note: This section was also introduced in 8-11 of *Course 1* and 8-11 of *Course 2*.

7-9 Tessellations

Vocabulary *tessellation regular tessellation*

Example 1 Creating a Tessellation
Example 2 Creating a Tessellation by Transforming a Polygon

Note: This section was mostly new to students although it was introduced in Chapter 8 (p.498) of *Course 2* regarding "Create Tessellations."

Chapter 8
Perimeter, Area, and Volume

Chapter 8 dealt with perimeter, area, and volume. There were 11 sections including an extension section.

8-1 Perimeter and Area of Rectangles & Parallelograms

Vocabulary *perimeter areas*

Example 1 Finding the Perimeter of Rectangles and Parallelograms
Example 2 Using a Graph to Find Area

Example 3 Finding Area and Perimeter of a Composite Figure

Note: This section was also introduced in 9-7 of *Course 1*, and 9-2, 9-3, and 9-4 of *Course 2*. It would be good if more examples on composite figures were added for students to practice, because some students had difficulty solving problems.

8-2 Perimeter and Area of Triangles and Trapezoids

Example 1 Finding the Perimeter of Triangles and Trapezoids
Example 2 Finding a Missing Measurement
Example 3 Multi-Step Application

Note: This section was also introduced in 9-7, 10-2, and 10-4 of *Course 1*, and 9-2 and 9-4 of *Course 2*.

8-3 Circles

Vocabulary *circle radius diameter circumference*

Example 1 Finding the Circumference of a Circle
Example 2 Finding the Area of a Circle
Example 3 Finding Area and Circumference on a Coordinate Plane
Physical Science Application

Note: This section was also introduced in 10-5 of *Course 1*, 9-2 and 9-5 of *Course 2*.

8-4 Drawing Three-Dimensional Figures

Vocabulary *face edge vertex orthogonal views*

Example 1 Identifying Vertices, Edges, and Faces
Example 2 Drawing a Figure When Given Different Perspectives
Example 3 Drawing different Perspectives of a Figure

Note: This section was also introduced in 10-6 of *Course 1* and 10-1 of *Course 2*.

8-5 Volume of Prisms and Cylinders

Vocabulary *cylinder prism*

Example 1 Finding the Volume of Prisms and Cylinders
Example 2 Exploring the Effec6ts of Changing Dimensions
Example 3 Music Application
Example 4 Finding the Volume of Composite Figures

Note: Example 4 above was a good example, but this section was also introduced in 10-7 and 10-8 of *Course 1* and 10-2 of *Course 2*.

8-6 Volume of Pyramids and Cones

Vocabulary *pyramid cone*

Example 1 Finding the Volume of Pyramids and cones
Example 2 Exploring the Effects of Changing Dimensions
Example 3 Social Studies Application
Example 4 Using a Calculator to Find Volume

Note: This section was also introduced in 10-2 and 10-2 of *Course 2*.

8-7 Surface Area of Pyramids and Cones

Vocabulary *Surface area lateral face lateral surface*

Example 1 Finding Surface Area
Example 2 Exploring the Effects of changing Dimensions
Example 3 Art Application

Note: This section was also stated in 10-9 of *Course 1* and 10-4 of *Course 2*.

8-8 Surface Area of Pyramids and cones

Vocabulary *slant height regular pyramid right cone*

Example 1 Finding surface Area
Example 2 Exploring the Effect of Changing Dimension
Example 3 Life Science application

Note: This section was also introduced in 10-9 of *Course 1* and 10-4 of *Course 2*.

8-9 Sphere

Vocabulary *sphere hemisphere great circle*

Example 1 Finding the Volume of a Sphere
$V = \frac{4}{3}\pi r^3$
Example 2 Finding Surface Area of a sphere
Example 3 Comparing Volumes and Surface Areas

Note: This section was new to students.

8-10 Scaling Three-Dimensional figures

Vocabulary *capacity*

Example 1 Scaling Models That Are Cubes
Example 2 Scaling Models That Are Other Solid Figures
Example 3 Business application

Note: This section was also mentioned in 10-5(Changing Dimension) of *Course 2*.

Extension Symmetry in Three Dimensions

Vocabulary *bilateral symmetry*

Example 1 Identifying Symmetry in a Solid Figure
Example 2 Drawing a Cross Section

Note: This section was also mentioned in the extension section in Chapter 10 of *Course 2*.

Chapter 9
Data and Statistics

Chapter 9 dealt with data and statistics. There were 8 sections in it.

9-1 Samples and Surveys

Vocabulary *population sample random sample systematic sample stratified sample voluntary-response sample biased sample*

Example 1 Identifying Sampling Methods
Example 2 Identifying Biased Samples

Note: This section was also mentioned in 7-8 of *Course 2*. There is a good table to show how to use each method above.

9-2 Organizing Data

Vocabulary *line plot stem-and-leaf plot back-to back stem-and-leaf plot Venn diagram*

Example 1 Organizing data in Line Plots
Example 2 Reading Stem-and-leaf Plots
Example 3 Organizing Data in Back-to-Back Stem-and-Leaf Plots
Example 4 Organizing Data in Venn Diagram

Note: This section was also introduced in 7-1, 7-5, and 7-6 of *Course 2* except that Example 3 above was new.

9-3 Measures of Central Tendency

Vocabulary *mean median mode range outlier*

Example 1 Finding Measures of Central Tendency and Range
Example 2 Choosing the Best Measure of Central Tendency
Example 3 Business Application

Note: This section was also introduced in 7-2 of *Course 2*.

9-4 Variability

Vocabulary *variability quartile box-and-whisker*

Example 1 Finding Measures of Variability
Example 2 Making a Box-and-Whisker Plot
Example 3 Comparing Data Sets Using Box-and-Whisker Plots

Note: This section was also mentioned in 7-5 of *Course 2*.

9-5 Displaying Data

Vocabulary *double-bar graph frequency table histogram double-line graph*

Example 1 Displaying Data in a Double-Bar-Graph
Example 2 Displaying Data in a Histogram
Example 3 Displaying Data in a Line Graph

Note: This section was also mentioned in 7-1, 7-3, and 7-6 of *Course 2*.

9-6 Misleading Graphing and statistics

Example 1 Identifying Misleading Graphs
Example 2 Identifying Misleading Statistics

Note: This section was also introduced in 6-8 of *Course 1* and 7-10 of *Course 2*.

9-7 Scatter Plots

Vocabulary *scatter plot correlation line of best fit*

Example 2 Identifying the Correlation of Data
Example 3 Using a Scatter Plot to Make Predictions

Note: This section was also introduced in 7-9 of *Course 2*.

9-8 Choosing the Best Representation of Data

Example 1 Selecting a Data Display
Example 2 Problem solving Application

Note: This section was also introduced in 6-10 of *Course 1* and 7-7 of *Course 2*.

Chapter 10 Probability

Chapter 10 dealt with probability. There were 9 sections in it.

10-1 Probability

Vocabulary *experiment trial outcome sample space event probability impossible certain*

Example 1 finding Probabilities of Outcomes in a Sample Space

Give the probability for each outcome.

A) The weather of forecast shows a 30% chance of snow.

P(snow) = 30% = 0.3

Outcome	Snow	No Snow
Probability		

The probabilities must add to 1, so the probability of no snow is p(no snow) = 1 – 0.3 = 0.7, or 70%.

Example 2 finding Probabilities of Events

Example 3 Problem Solving Application

Note: This section was also introduced in 12-1 of *Course 1* and 11-1 of *Course 2*.

10-2 Experimental Probability

Vocabulary *experimental probability*

Example 1 Estimating the Probability of an Event

Example 2 Safety Application

Note: This section was also introduced in 12-2 of *Course 1* and 11-2 of *Course 2*.

10-3 Use a Simulation

Vocabulary *simulation random numbers*

Example 1 Problem solving application

Note: This section was new to students.

10-4 Theoretical Probability

Vocabulary *theoretical probability equally likely fair mutually exclusive disjoint events*

Example 1 Calculating Theoretical Probability

Example 2 Calculating Probability for Two Fair Number Cubes

Example 3 Altering Probability

Example 4 Finding the Probability of Mutually Exclusive Events

Note: Example 3 was new to students, but this section was also introduced in 12-4 of *Course 1* and 11-4 of *Course 2*.

10-5 Independent and Dependent Events

Vocabulary *compound event Independent events dependent events*

Example 1 Classifying Events as Independent or Dependent
Example 2 Finding the Probability of Independent Events
Example 3 Finding the Probability of Dependent Events

Note: This section was also introduced in 11-5 of *Course 2*.

10-6 Making Decisions and Predictions

Example 1 Using Probability to Make Decisions and Predictions
Example 2 Deciding Whether a Game is Fair

Note: This section was also mentioned in 12-1 of *Course 1* and 11-1 of *Course 2*.

10-7 Odds

Vocabulary *odds in favor odds against*

Example 1 Finding Odds
Example 2 Converting Odds to Probability
Example 3 Converting Probabilities to Odds

Note: This section was new to students. It should be introduced in 7^{th} grade.

10-8 Counting Principles

Vocabulary *Fundamental Counting Principle tree diagram Addition counting Principle*

Example 1 Using the Fundamental Counting Principle
Example 2 Using a Tree Diagram
Example 3 Using the Addition Counting Principle

Note: This section was also introduced in 12-3 of *Course 1* and 11-3 of *Course 2*.

10-9 Permutations and Combinations

Vocabulary *factorial permutation combination*

Permutations ${}_nP_r = \frac{n!}{(n-r)!}$

Example 1 Evaluating Expressions Containing Factorials
Example 2 Finding Permutation
B) Find the number of ways the 7 swimmers can finish first, second, and third.
${}_7P_3 = \frac{7!}{(7-3)!} = 210$
Combinations ${}_nC_r = \frac{nPr}{r!} = \frac{n!}{r!(n-r)!}$

Note: This section was introduced in 11-7 of *Course 2*.

Chapter 11
Multi-Step Equations and Inequalities

Chapter 11 dealt with multi-step equations and inequalities. There were 6 sections in it.

11-1Simplifying Algebraic Expression

Vocabulary *term like term equivalent expression simplify*

Example 1 Combining Like Terms to Simplify
Example 2 Combining Like Terms in Tw0-Variable Expressions
Example 3 Using the distributive Property to Simplify
Simplify 6(y + 8) – 5y
Example 4 Combining Like Terms to Solve algebraic Equations
Solve 9 x – x = 136

Note: This section was also introduced in 1-9, 12-1 and 12-2 of Course.

11-2 Solving Multi-Step Equations

Example 1 Solving Equations That Contain Like Terms
Solve. 3x + 5 + 6x – 7 = 25
Example 2 Solving Equations That Contain Fractions (No negative involved)

Note: This section was also introduced in 12-2 of *Course 2*.

11-3 Solving Equations with Variables on Both Sides

Example 1 Solving Equations with Variables on Both Sides

A) $2a + 3 = 3a$ B) $3v - 8 = 7 + 8v$

Example 2 Solving Multi-Step Equations with Variables on Both Sides

Note: This section was also introduced in 12-3 of *Course 2*.

11-4 Solving Inequalities by Multiplying or dividing

Example 1 Solving Inequalities by Multiplying or Dividing

Solve and Graph.

A) $24 > \frac{h}{5}$ B) $-7x \geq 42$

Example 2 Problem solving Application

Note: This section was also introduced in 12-6 of *Course 2*.

11-5 Solving Two-Step Inequalities

Example 1 Solving Two-Step Inequalities

Solve and graph.

A) $7y - 4 > 24$ B) $-2x + 4 \leq 3$

Example 2 Solving Inequalities That Contain Fractions

Note: This section was also introduced in the extension section of Chapter 2 in *Course 1*, and 12-7 in *Course 2*.

11-6 Systems of Equations

Vocabulary *system of equations* *solution of a system of equation*

Example 1 Solving systems of Equations

A) $y = x + 3$
$y = 2x + 5$

Example 2 Solving systems of Equations by Solving for a Variable

B) $3x + y = 8$
$6x + 2y = 16$

Note: This section was new to students. It was hard for students to solve word problems involving system of equation. More word problems should be included in this section so that students could practice them.

Chapter 12
Graphing Lines

Chapter 12 dealt with graphing lines. There were 8 sections including an extension section in it.

12-1 Graphing Linear Equations

Vocabulary *linear equation*

Example 1 Graphing Equations

A) y = 3x -4

B) $y = -x^2$ C) $y = -\frac{3x}{4}$ d) y = -3

Example 2 Physical Science application

Note: This section was also introduced in 4-2 and 4-6 of *Course 2*.

12-2 Slope of a Line

$$\text{Slope} = \frac{\text{vertical change}}{\text{horizontal change}} = \frac{\text{change in y}}{\text{change in x}} \quad \rightarrow \quad \frac{y_2 - y_1}{x_2 - x_1}$$

Example 1 Finding Slope, Given Two Points

Example 2 Identifying Constant and Variable Rates of Change in Graphs

Note: This section was also introduced 5-3 of *Course 2*, but no $\frac{rise}{run}$ is indicated on Page 633.

12-3 Using Slopes and Intercepts

Vocabulary *x-intercept y-intercept slope-intercept form*

Example 1 Finding x-intercepts and y-intercepts to Graph Linear Equations

3x + 4y = 12 → x = 4 y = 3

$y = mx + b$ (m is slope and b is y-intercept)

Example 2 Using Slope-Intercept Form to Find Slopes and y-intercepts

A) y = x y = 1 x + 0

The slope of the line y = x is 1 and the y-intercept is 0.

B) 8x = 5y

C) $3x + 7y = 9$

Example 4 Writing Slope-Intercept Form

Writing the equation of the line that passes through (-3, 1) and (2, -1) in slope-intercept form.

Find the slope.

$\frac{y2-y1}{x2-x1} = \frac{-1-1}{2-(-3)} = -\frac{2}{5}$

Substitute either point and the slope into the slope- intercept form and solve for *b*.

$y = mx + 6 \rightarrow -1 = -\frac{2}{5}(2) + b \rightarrow -1 = -\frac{4}{5} + b \rightarrow b = -\frac{1}{5}$

Note: This section was also mentioned in 4-1 and 5-3 of *Course 2*.

12-4 Point-slope Form

Vocabulary *point-of-slope*

The point-slope form of an equation of a line with slope *m* passing through (x_1, y_1) is $y - y_1 = m(x - x_1)$.

Point on the line (x_1, y_1) Point-slope form $y - y_1 = m(x - x_1)$

Example 1 Using Point-Slope form to Identify Information about a Line

Use the point-slope form of each equation to identify a point the line passes through And the slope of the line

A) $y - 9 = -\frac{2}{3}(x-21)$

$y - y_1 = m(x - x_1)$

$y - 9 = -\frac{2}{3}(x-21)$

$m = -\frac{2}{3}$ $(x_1, y_1) = (21, 9)$

The line defined by $y - 9 = -\frac{2}{3}(x-21)$ has a slope $-\frac{2}{3}$, and passes through the point (21, 9).

Example 2 Writing the Point-Slope form of an Equation

A) the line with slope -2 passing through (4, 1)

$y - y_1 = m(x - x_1)$

$y - 1 = -(x-4)$

The equation of the line with slope -2 that passes through (4, 1) in point-slope form is $y - 1 = -2(x - 4)$

Example 3 Medical Application

Note: This section was new to students.

12-5 Direct Variation

Vocabulary *direct variation* *constant of proportionality*

Algebra $y = kx$ $k = \frac{y}{k}$

Example 1 Determining Whether a Data Set Varies directly (Seems new?)
Example 2 Finding Equations of Direct Variation
A) y is 48 when x is 3 → $y = kx$ $48 = k \cdot 3 \rightarrow 16 = k \rightarrow y = 16x$
B) y is 15 when x is 10 → $\frac{3}{2} = k \rightarrow y = \frac{3}{2}x$
Example 3 Physical Science Application

Note: This section was new to students.

12-6 Graphing Inequalities in Two Variables

Vocabulary *boundary line* *linear inequality*

Example 1 Graphing Inequalities
A) $y > x + 3$ B) $y \leq x + 1$ C) $6y + 3x \leq 12$ (Seems new?)

Note: This section was new to students.

12-7 Lines of Best Fit

Example 1 Finding a Line of Best Fit
Example 2 Sports Application

Note: This section was also mentioned in 7-9 of *Course 2*. It was also mentioned on Page 420 in *Course 2*.

Extension Solving systems of Equations by Graphing

Example 1 Using a Graphing to Solve a System of Linear Equations (Seems new?)
$3x + y = 5$
$y - x = 1$
Example 2 Graphing a system of Linear Equations to Solve a Problem

Note: This extension was new to students.

Chapter 13
Sequences and Functions

Chapter 13 dealt with sequences and functions. There were 7 sections in it.

13-1 terms of Arithmetic Sequences

Example 1 Identifying Arithmetic Sequences
Formula: $a_n = a_1 = (n-1)d$
Example 2 Finding a given Term of an Arithmetic Sequences
Example 3 Consumer Application

Note: This section was also mentioned in 1-7 of *Course 1* and 4-5 of *Course 2*.

13-2 Terms of Geometric Sequences

Vocabulary *geometry sequence common ratio*

Example 1 Identifying Geometric Sequences
Formula: $a_n = a_1 r^{n-1}$
Example 2 Finding a Given Term of a Geometric Sequence

Note: This section was also introduced in 4-5 of *Course 2*.

13-3 Other Sequences

Vocabulary *first differences second difference Fibonacci sequence*

Example 1 Using First And Second differences
Example 2 Finding a Rule given Terms of a Sequence
Example 3 Finding Terms of a Sequence given a Rule
Example 4 Using the Fibonacci Sequence

Note: This section was new to students, but the compilers should add to it how to build formulas from finding differences.

13-4 Linear Functions

Vocabulary *linear function function notation*

The linear function $f(x) = mx + b$ has a slope of a m and a y-intercept of b.

Example 1 Identifying Linear Functions

Determine whether f(x) = 2x – 2 is linear. It has a slope of 2 and a y-intercept of -2

Example 2 Writing the Equation for a linear Function

Example 3 Physical Science Application

Note: It was found that some students had difficulty writing a rule for linear function. This section was also partially introduced in 4-6 of *Course 2*.

13-5 Exponential Functions

Vocabulary *exponential function* *exponential growth* *exponential decay*

Example 1 Graphing Exponential functions

Example 2 Using an Exponential Growth Function

Example 3 Using Exponential Decay Function

Note: This section was also mentioned in the extension section of Chapter 4 in *Course 2*.

13-6 Quadratic Functions

Vocabulary *quadratic function* *parabola*

$f(x) = ax^2+bx + c$ The y-intercept is c.

The graph of all quadratic functions have the same basic shape, called a **parabola**.

Example 1 Graphing Quadratic Functions

A) $f(x) = x^2 – 3$ B) f(x) = ^{2} + x -2

Example 2 Astronomy application

Note: This section was new to students, but the compilers didn't mention examples that it was negative when a parabola faced down.

13-7 Inverse Variation

Vocabulary *inverse variation*

An inverse variation is a relationship in which one variable quality increases as another variable quantity decreases. The product of the variable is a **constant.**

Algebra*:* $y = \frac{k}{x}$ $xy=k$ (k≠0 and x≠ 0)

Example 1 Identifying Inverse Variation

Example 2 Graphing Inverse Variations

Create a table. Then graph each inverse variation function.

A) $f(x) = \frac{1}{x}$ B) $f(x) = \frac{-2}{x}$

Example 3 Music Application

Note: This section was new to students. More word problems should be added so that students could practice solving problems.

Chapter 14
Polynomials

Chapter 14 dealt with polynomials. There were 7 sections including an extension section it.

14-1 Polynomials

Vocabulary *monomial polynomial binomial trinomial degrees of a polynomial*

Example 1 Identifying Monomials

Example 2 Classifying Polynomials by the Number of Terms

Example 3 Classifying Polynomials by Their Degrees

Example 4 Physics Application

Note: This section was new to students. The table showed students how to distinguish between "monomials" and "Not Monomials."

14-2 Simplifying Polynomials

Example 1 Identifying Like Terms

Example 2 Simplifying Polynomials by combing Like Terms

Example 3 Simplifying Polynomials by Using the Distributive Property

Note: This section was new to students.

14-3 Adding Polynomials

Example 1 Adding Polynomials Horizontally

Example 2 Adding Polynomials Vertically

Note: This section was new to students.

14-4 Subtracting Polynomials

Example 1 Finding the Opposite of a Polynomial
Example 2 Subtracting Polynomials Horizontally
Example 3 Subtracting Polynomials Vertically

Note: This section was new to students.

14-5 Multiplying Polynomials by Monomials

Example 1 Multiplying Monomials
Example 2 Multiplying a Polynomial by Monomial
Example 3 Problem solving Application

Note: This section was new to students.

14-6 Multiplying Binomials

Vocabulary *FOIL*

Example 1 Multiplying Two Binomials
A) (p+2) (3-q)
Example 2 Multi-Step
Example 3 Special Products of Binomials
A) $(x-3)^2$ B) $(a+b)^2$ C) (n+3) (n-3)

Special Products of Binomials
$(a+b)^2 = a^2 + 2qb + b^2$
$(a-b)^2 = a^2 - 2ab + b^2$
$(a+b)(a-b) = a^2 - b^2$

Note: This section was new to students.

Extension Dividing Polynomials by Monomials

Example 1 Dividing Monomials by Monomials
A) $\frac{12x^7}{2x^3} \rightarrow 6x^{7-3} \rightarrow 6x^4$
Example 2 Dividing Polynomials by Monomials

A) $(x^4 + 3x^3 - 5x^2) \div x^2$

$$\frac{x^4 + 3x^3 - 5x^2}{x^2} = \frac{x^4}{x^2} + \frac{3x^3}{x^2} - \frac{5x^3}{x^2} = x^2 + 3x - 5$$

Example 3 Factoring Polynomials

A) $3x^3 + 9x^5 - 6x^2 \rightarrow$ The GCF is $3x^2 \rightarrow 3x^2(x + 3x^3-2)$

Note: This section was new to students.

I. Table 3B

(Mathematics *Course 3*)

Mathematics *Course 3* was analyzed. The following mini tables were shown to see whether or not the contents of each chapter were overlapped in each grade (*Course 1*, *Course 2*, and *Course 3*). For example, when *1-1 Variables and Expressions* was shown in Mathematics *Course 3*, it meant that *1-1 Variable and Expressions* was also introduced or mentioned in *1-7 Variables and Algebraic Expressions* in Mathematics *Course 2* and in *2-1 Variables and Expressions* in Mathematics *Course 1*. They were somewhat related.

Chapter 1 Principles of Algebra

Names of Text Books	Mathematics *Course 1*	Mathematics *Course 2*	Mathematics *Course 3*
Contents	2-1 Variables and Expressions	1-7 Variables and Algebraic Expression	1-1 Variables and Expressions

Names of Text Books	Mathematics *Course 1*	Mathematics *Course 2*	Mathematics *Course 3*
Contents	2-1 Variables and Expressions	1-7 Variables and Algebraic Expressions	1-2 Algebraic Expressions

Names of Text Books	Mathematics *Course 1*	Mathematics *Course 2*	Mathematics *Course 3*
Contents	p.762	2-1 Integers	1-3 Integers and Absolute Value

Names of Text Books	Mathematics *Course 1*	Mathematics *Course 2*	Mathematics *Course 3*
Contents	11-4 Adding Integers	2-2 Adding Integers	1-4 Adding Integers

Names of Text Books	Mathematics *Course 1*	Mathematics *Course 2*	Mathematics *Course 3*
Contents	11-5 Subtracting Integers	2-3 Subtracting Integers	1-5 Subtracting Integers

Names of Text Books	Mathematics *Course 1*	Mathematics *Course 2*	Mathematics *Course 3*
Contents	11-6 Multiplying Integers 11-7 Dividing Integers	2-4 Multiplying and Dividing Integers	1-6 Multiplying And Dividing Integers

Names of Text Books	Mathematics *Course 1*	Mathematics *Course 2*	Mathematics *Course 3*
Contents	11-8 Solving Integers Equations 2-5 Addition Equations 2-6 Subtraction Equations	1-11 Addition and Subtraction Equations	1-7 Solving Equations by Adding or Subtracting

Names of Text Books	Mathematics *Course 1*	Mathematics *Course 2*	Mathematics *Course 3*
Contents	2-7 Multiplication Equations 2-8 Division Equations	1-12 Multiplication and Division Equations	1-8 Solving Equations by Multiplying or Dividing

Names of Text Books	Mathematics *Course 1*	Mathematics *Course 2*	Mathematics *Course 3*
Contents	Extension Section of Chapter 2	12-4 Inequalities 12-5 Solving Inequalities by Adding or Subtracting 12-6 Solving Inequalities by Multiplying or Dividing 12-7 Solving two-Step Inequalities	1-9 Introduction to Inequality

Chapter 2 Rational Numbers

Names of Text Books	Mathematics *Course 1*	Mathematics *Course 2*	Mathematics *Course 3*
Contents	3-1 Representing, Comparing, and Ordering Decimals	2-11 Comparing and Ordering Rational Numbers	2-1 Rational Numbers

Names of Text Books	Mathematics *Course 1*	Mathematics *Course 2*	Mathematics *Course 3*
Contents	3-1 Representing, Comparing, and Ordering Decimals 4-7 Comparing and Ordering Fractions	2-11 Comparing and Ordering Rational Numbers	2-2 Comparing and Ordering Rational Numbers

Names of Text Books	Mathematics *Course 1*	Mathematics *Course 2*	Mathematics *Course 3*
Contents	4-8 Adding and Subtracting with Like Denominators	3-7 Problem solving Skills: Estimate with Fractions 3-8 Adding and Subtracting fractions 3-9 Adding and Subtracting Mixed Numbers	2-3 Adding and Subtracting Rational Numbers

Names of Text Books	Mathematics *Course 1*	Mathematics *Course 2*	Mathematics *Course 3*
Contents	5-8 Multiplying Mixed Numbers	3-10 Multiplying Fractions and Mixed Numbers	2-4 Multiplying Rational Numbers

Names of Text Books	Mathematics *Course 1*	Mathematics *Course 2*	Mathematics *Course 3*
Contents	5-9 Dividing Fractions and Mixed Numbers	3-11 Dividing Fractions and Mixed Numbers	2-5 Dividing Rational Numbers

Names of Text Books	Mathematics *Course 1*	Mathematics *Course 2*	Mathematics *Course 3*
Contents	5-3 Adding and Subtracting Mixed Numbers 5-4 Regrouping to Subtract Mixed Numbers	3-8 Adding and Subtracting Fractions 3-12 Solving Equations Containing Fractions	2-6 Adding and Subtracting with Unlike Denominators

Names of Text Books	Mathematics *Course 1*	Mathematics *Course 2*	Mathematics *Course 3*
Contents	2-5 Addition Equations 2-6 Subtraction Equations 2-8 Division Equations	2-5 Solving Equations Containing Integers 3-6 Solving Equations Containing Decimals	2-7 Solving Equations with Rational Numbers

Names of Text Books	Mathematics *Course 1*	Mathematics *Course 2*	Mathematics *Course 3*
Contents	2-8 Division Equations	2-5 Solving Equations Containing Integers 12-1 Solving Two-Step Equations	2-8 Solving Two-Step Equations

Chapter 3 Graphs, Functions, and Sequences

Names of Text Books	Mathematics *Course 1*	Mathematics *Course 2*	Mathematics *Course 3*
Contents	11-10 Graphing Functions	4-4 Functions, Tables, and Graphs	3-1 Ordered Pairs

Names of Text Books	Mathematics *Course 1*	Mathematics *Course 2*	Mathematics *Course 3*
Contents	6-6 Ordered Pairs 11-3 The Coordinate Plane	4-1 The Coordinate Plane 4-2 Tables and Graphs	3-2 Graphing on a Coordinate Plane

Names of Text Books	Mathematics *Course 1*	Mathematics *Course 2*	Mathematics *Course 3*
Contents	p.338	4-3 Interpreting Graphs	3-3 Interpreting Graphs and Tables

Names of Text Books	Mathematics *Course 1*	Mathematics *Course 2*	Mathematics *Course 3*
Contents	11-9 Tables and Functions	4-4 Functions, Tables, and Graphs	3-4 Functions

Names of Text Books	Mathematics *Course 1*	Mathematics *Course 2*	Mathematics *Course 3*
Contents	11-10 Graphing Functions	4-6 Graphing Linear Functions	3-5 Equations, Tables, and Graphs

Names of Text Books	Mathematics *Course 1*	Mathematics *Course 2*	Mathematics *Course 3*
Contents	1-7 Pattern and Sequences	4-5 Problem Solving Skill: Find a Pattern in Sequences	3-6 Arithmetic Sequences

Chapter 4 Exponents and Roots

Names of Text Books	Mathematics *Course 1*	Mathematics *Course 2*	Mathematics *Course 3*
Contents	1-3 Exponent	1-2 Exponents	4-1 Exponents

Names of Text Books	Mathematics *Course 1*	Mathematics *Course 2*	Mathematics *Course 3*
Contents	None	Extension Section: Negative Exponent in Chapter 2	4-2 Look for a Pattern in Integers Exponents

Names of Text Books	Mathematics *Course 1*	Mathematics *Course 2*	Mathematics *Course 3*
Contents	None	None	4-3 Properties of Exponents

Names of Text Books	Mathematics *Course 1*	Mathematics *Course 2*	Mathematics *Course 3*
Contents	3-4 Scientific Notation Negative Exponent in Extension Section of Chapter 11	1-4 Applying Exponents Extension Section of Chapter 2	4-4 Scientific Notation

Names of Text Books	Mathematics *Course 1*	Mathematics *Course 2*	Mathematics *Course 3*
Contents	None	9-7 Squares and Square Roots	4-5 Squares and Square Roots

Names of Text Books	Mathematics *Course 1*	Mathematics *Course 2*	Mathematics *Course 3*
Contents	None	9-7 Squares and Square Roots	4-6 Estimating Square Roots

Names of Text Books	Mathematics *Course 1*	Mathematics *Course 2*	Mathematics *Course 3*
Contents	4-4 Decimals and Fractions	2-11 Comparing and Ordering Rational Numbers	4-7 The Real Numbers

Names of Text Books	Mathematics *Course 1*	Mathematics *Course 2*	Mathematics *Course 3*
Contents	None	9-8 The Pythagorean Theorem	4-8 The Pythagorean Theorem

Chapter 5 Ratios, Proportions, and Similarity

Names of Text Books	Mathematics *Course 1*	Mathematics *Course 2*	Mathematics *Course 3*
Contents	7-1 Ratios and Rates	5-1 Ratios	5-1 Ratios and Proportions

Names of Text Books	Mathematics *Course 1*	Mathematics *Course 2*	Mathematics *Course 3*
Contents	7-1 Ratios and Rates 7-2 Using Tables to Explore Equivalent Ratios and Rates	5-2 Rates	5-2 Ratios, Rates, and Unit Rates

Names of Text Books	Mathematics *Course 1*	Mathematics *Course 2*	Mathematics *Course 3*
Contents	9-1 Understanding Customary Units of Measure 9-3 Converting Customary Units	5-6 Customary Measurement Extension Section of Chapter 5	5-3 Dimensional Analysis

Names of Text Books	Mathematics *Course 1*	Mathematics *Course 2*	Mathematics *Course 3*
Contents	7-3 Proportions	5-5 Solving Proportion	5-4 Solving Proportions

Names of Text Books	Mathematics *Course 1*	Mathematics *Course 2*	Mathematics *Course 3*
Contents	7-5 Indirect Measurement 7-6 Scale Drawing and Maps	5-7 Similar Figures and Proportions 5-8 Using Similar Figures 5-9 Scale Drawings and Scale Models	5-5 Similarity and Scale

Names of Text Books	Mathematics *Course 1*	Mathematics *Course 2*	Mathematics *Course 3*
Contents	7-6 Scale Drawing and Maps	Extension Section of Chapter 8	5-6 Dilations

Names of Text Books	Mathematics *Course 1*	Mathematics *Course 2*	Mathematics *Course 3*
Contents	7-3 Proportions	5-4 Identifying and Writing Proportions 5-5 Solving Proportion	5-7 Indirect Measurement

Names of Text Books	Mathematics *Course 1*	Mathematics *Course 2*	Mathematics *Course 3*
Contents	7-6 Scale Drawing and Maps	5-9 Scale Drawings and Scale Models	5-8 Scale Drawing and Scale Models

Chapter 6 Percents

Names of Text Books	Mathematics *Course 1*	Mathematics *Course 2*	Mathematics *Course 3*
Contents	3-1 Representing, Comparing, and Ordering Decimals 4-4 Decimals and Fractions 4-7 Comparing and Ordering Fractions 7-8 Percents, Decimals, and Fractions	2-11 Comparing and Ordering Rational Numbers	6-1Relating Decimals, Fractions, and Percents

Names of Text Books	Mathematics *Course 1*	Mathematics *Course 2*	Mathematics *Course 3*
Contents	4-9 Estimating Fractions Sums and Differences	6-3 Problem Solving skill: Estimate with Percents	6-2 Estimating with Percents

Names of Text Books	Mathematics *Course 1*	Mathematics *Course 2*	Mathematics *Course 3*
Contents	7-9 Percent Problems	6-4 Percent of a Number	6-3 Finding Percents

Names of Text Books	Mathematics *Course 1*	Mathematics *Course 2*	Mathematics *Course 3*
Contents	7-9 Percent Problems	6-5 Solving Percent Problems	6-4 Finding a Number When the Percent is Unknown

Names of Text Books	Mathematics *Course 1*	Mathematics *Course 2*	Mathematics *Course 3*
Contents	7-10 Using Percents	6-6 Percent of Change	6-5 Percent Increase and Decrease

Names of Text Books	Mathematics *Course 1*	Mathematics *Course 2*	Mathematics *Course 3*
Contents	7-10 Using Percents	6-6 Percent of Change	6-6 Application of Percents

Names of Text Books	Mathematics *Course 1*	Mathematics *Course 2*	Mathematics *Course 3*
Contents	Extension Section of Chapter 7	6-7 Simple Interest	6-7 Simple Interest

Chapter 7 Foundation of Geometry

Names of Text Books	Mathematics *Course 1*	Mathematics *Course 2*	Mathematics *Course 3*
Contents	8-1 Building Blocks of Geometry	8-1 Building Blocks of Geometry	7-1 Points, Lines, Planes, and Angles

Names of Text Books	Mathematics *Course 1*	Mathematics *Course 2*	Mathematics *Course 3*
Contents	8-4 Classifying Lines	8-3 Angle Relationships	7-2 Parallel and Perpendicular Lines

Names of Text Books	Mathematics *Course 1*	Mathematics *Course 2*	Mathematics *Course 3*
Contents	8-2 Measuring and Classifying Angles 8-3 Angle Relationships 8-5 Triangles	8-3 Angle Relationships	7-3 Angles in Triangles

Names of Text Books	Mathematics *Course 1*	Mathematics *Course 2*	Mathematics *Course 3*
Contents	8-6 Quadrilaterals 8-7 Polygons	8-5 Classifying Polygons 8-6 Classifying Triangles 8-7 Classifying Quadrilaterals	7-4 Classifying Polygons

Names of Text Books	Mathematics *Course 1*	Mathematics *Course 2*	Mathematics *Course 3*
Contents	None	5-3 Slope and Rates of Change	7-5 Coordinate Geometry

Names of Text Books	Mathematics *Course 1*	Mathematics *Course 2*	Mathematics *Course 3*
Contents	8-9 Congruence	8-9 Congruent Figures	7-6 Congruence

Names of Text Books	Mathematics *Course 1*	Mathematics *Course 2*	Mathematics *Course 3*
Contents	8-10 Transformation	8-10 Translations, Reflections, and Rotations	7-7 Transformation

Names of Text Books	Mathematics *Course 1*	Mathematics *Course 2*	Mathematics *Course 3*
Contents	8-11 Line Symmetry	8-11 Symmetry	7-8 Symmetry

Names of Text Books	Mathematics *Course 1*	Mathematics *Course 2*	Mathematics *Course 3*
Contents	p.468 (Create Tessellation)	p.498 of Chapter 8	7-9 Tessellations

Chapter 8 Perimeter, Area, and Volume

Names of Text Books	Mathematics *Course 1*	Mathematics *Course 2*	Mathematics *Course 3*
Contents	9-7 Perimeter	9-2 Perimeter and Circumference 9-3 Area of Parallelogram 9-4 Area of Triangles and Trapezoids	8-1Perimeter and Area of Rectangles & Parallelograms

Names of Text Books	Mathematics *Course 1*	Mathematics *Course 2*	Mathematics *Course 3*
Contents	9-7 Perimeter 10-2 Area of Triangles and Trapezoids 10-4 Comparing Perimeter and Area	9-2 Perimeter and Circumference 9-4 Area of Triangles and Trapezoids	8-2 Perimeter and Area of Triangles and Trapezoids

Names of Text Books	Mathematics *Course 1*	Mathematics *Course 2*	Mathematics *Course 3*
Contents	9-8 Circles and Circumferences 10-5 Area of Circles	9-2 Perimeter and Circumference 9-5 Area of Circles	8-3 Circles

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Names of Text Books	Mathematics *Course 1*	Mathematics *Course 2*	Mathematics *Course 3*
Contents	10-7 Volume of Prisms 10-8 Volume of Cylinders	10-2 Volume of Prism and Cylinders	8-5 Volume of Prisms and Cylinders

Names of Text Books	Mathematics *Course 1*	Mathematics *Course 2*	Mathematics *Course 3*
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Names of Text Books	Mathematics *Course 1*	Mathematics *Course 2*	Mathematics *Course 3*
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Contents	None	None	8-9 Sphere

Names of Text Books	Mathematics *Course 1*	Mathematics *Course 2*	Mathematics *Course 3*
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Names of Text Books	Mathematics *Course 1*	Mathematics *Course 2*	Mathematics *Course 3*
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Names of Text Books	Mathematics *Course 1*	Mathematics *Course 2*	Mathematics *Course 3*
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Names of Text Books	Mathematics *Course 1*	Mathematics *Course 2*	Mathematics *Course 3*
Contents	6-2 Mean, Median, Mode and Range	7-2 Medan, Median, Mode, and Range	9-3 Measures of Central Tendency

Names of Text Books	Mathematics *Course 1*	Mathematics *Course 2*	Mathematics *Course 3*
Contents	None	7-5 Box-and-Whisker Plots	9-4 Variability

Names of Text Books	Mathematics *Course 1*	Mathematics *Course 2*	Mathematics *Course 3*
Contents	6-4 Bar Graphs 6-5 Line Plots, Frequency Tables, and Histograms 6-7 Line Graphs	7-1 Frequency Tables, Stem-and-Leaf Plots, and Line Plots 7-3 Bar Graphs and Histograms 7-6 Line Graphs	9-5Displaying Data

Names of Text Books	Mathematics *Course 1*	Mathematics *Course 2*	Mathematics *Course 3*
Contents	6-8 Misleading Graphs	7-10 Misleading Graphs	9-6 Misleading Graphing and Statistics

Names of Text Books	Mathematics *Course 1*	Mathematics *Course 2*	Mathematics *Course 3*
Contents	None	7-9 Scatter Plots	9-7 Scatter Plots

Names of Text Books	Mathematics *Course 1*	Mathematics *Course 2*	Mathematics *Course 3*
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Chapter 10 Probability

Names of Text Books	Mathematics *Course 1*	Mathematics *Course 2*	Mathematics *Course 3*
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Names of Text Books	Mathematics *Course 1*	Mathematics *Course 2*	Mathematics *Course 3*
Contents	12-2 Experimental Probability	11-2 Experimental Probability	10-2 Experimental Probability

Names of Text Books	Mathematics *Course 1*	Mathematics *Course 2*	Mathematics *Course 3*
Contents	None	None	10-3 Use a Simulation

Names of Text Books	Mathematics *Course 1*	Mathematics *Course 2*	Mathematics *Course 3*
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Names of Text Books	Mathematics *Course 1*	Mathematics *Course 2*	Mathematics *Course 3*
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Names of Text Books	Mathematics *Course 1*	Mathematics *Course 2*	Mathematics *Course 3*
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Names of Text Books	Mathematics *Course 1*	Mathematics *Course 2*	Mathematics *Course 3*
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Names of Text Books	Mathematics *Course 1*	Mathematics *Course 2*	Mathematics *Course 3*
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Names of Text Books	Mathematics *Course 1*	Mathematics *Course 2*	Mathematics *Course 3*
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Names of Text Books	Mathematics *Course 1*	Mathematics *Course 2*	Mathematics *Course 3*
Contents	None	None	12-6 Graphing Inequalities in Two Variables

Names of Text Books	Mathematics *Course 1*	Mathematics *Course 2*	Mathematics *Course 3*
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Names of Text Books	Mathematics *Course 1*	Mathematics *Course 2*	Mathematics *Course 3*
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Names of Text Books	Mathematics *Course 1*	Mathematics *Course 2*	Mathematics *Course 3*
Contents	1-7 Pattern and Sequences	4-5 Problems Solving Skill: Find a Pattern in Sequences	13-2 Terms of Geometric Sequences

Names of Text Books	Mathematics *Course 1*	Mathematics *Course 2*	Mathematics *Course 3*
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Names of Text Books	Mathematics *Course 1*	Mathematics *Course 2*	Mathematics *Course 3*
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Names of Text Books	Mathematics *Course 1*	Mathematics *Course 2*	Mathematics *Course 3*
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Names of Text Books	Mathematics *Course 1*	Mathematics *Course 2*	Mathematics *Course 3*
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Names of Text Books	Mathematics *Course 1*	Mathematics *Course 2*	Mathematics *Course 3*
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Names of Text Books	Mathematics *Course 1*	Mathematics *Course 2*	Mathematics *Course 3*
Contents	None	None	14-4 Subtracting Polynomials

Names of Text Books	Mathematics *Course 1*	Mathematics *Course 2*	Mathematics *Course 3*
Contents	None	None	14-5 Multiplying Polynomials by Monomials

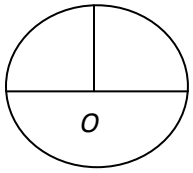
Names of Text Books	Mathematics *Course 1*	Mathematics *Course 2*	Mathematics *Course 3*
Contents	None	None	14-6 Multiplying Binomials

Names of Text Books	Mathematics *Course 1*	Mathematics *Course 2*	Mathematics *Course 3*
Contents	None	None	Extension: Dividing Polynomials by Monomials

J. Examples of *Circles*

The writer used examples of *Circle* to see how *Course 1*, *Course 2*, and *Course 3* mathematics textbooks dealt with *Circles* and how Chinese 6th grade mathematics textbook dealt with *Circles.* The following were excerpts from the mathematics textbooks of the two countries. All *Note* in each section was added from the writer's point of view based on the information obtained from each mathematics textbook. The Chinese was translated by the writer.

Circles

***Course 1* (6th Grade Math Text Book)**	**6th Grade Chinese Math Text Book** (*Translated by the Writer*.)
9-8 Circles and Circumference (p.520) *Note*: The section seemed to be taught in the second semester. **Example 1** Naming Parts of a Circle Name the circle, a diameter, and three radii.  *B* $\frac{C}{d} = \pi$ **Example 2** Architecture Application $C = \pi d$ **Example 3** Using the Formula for the Circumference of a Circle $C = \pi d$ *Note*: "How to find a radius or diameter when the circumference is given" was found in exercises on p.522.	**Chapter 4 Circles (p.55)** *Note:* The section was taught in the first semester of 6th grade. **Circles** **Example 1** Introduction of a center, radius, and diameter of a circle. *Note*: 1) There were exercises given to "Find the center of a circle and the diameter" when a circle was inscribed in a square and *vise versa*. 2) There were exercises used to "Find the axis of symmetry, given the two circles of different sizes and find the axis symmetry on the coordinate plane (p.59, p.61). 3) There were exercises given to "Find the radius or diameter of a circle, given the circle inscribed in a square with a side length of 10cm, etc" (p.60).

10-5 Area of Circles (p.558)

Example 1 Estimating the Area of a Circle

Example 2 Using the Formula for the Area of a Circle

$$A = \pi r^2$$

Note: There were exercises used to find the area of a circle, given the radius or diameter, but there were NO exercises used to find a radius or diameter in the section when the area of a circle was given.

Course 2 **(7th Grade Math Text Book)**

8-4 Properties of Circles (p.460)

Example 1 Identifying Parts of Circles

Name the parts of circle *p*.

A. Radii B. diameter C. chords

Note: "A *central angle* of a circle is an angle formed by two radii" was introduced here.

Example 2 PROBLEM SOLVING APPLICATION

Note: "How to find the central angle measure of a section" was introduced. As compared with *Course 1*, only "How to find a central angle measure" was new to students in this section. There were exercises used to name the parts of the circle (radii, diameters, chords).

9-5 Area of Circles (p.538)

Note: The section seemed to be taught in

Example 2 Circumference

$$C = \pi d \text{ or } C = 2\pi r$$

Note: 1) There were exercises given to find circumference of a circle, given radius or diameter.

2) There were exercises given to "Find the perimeter of a rectangular figure" when several circles, given the radius, were inscribed in the rectangle (p. 66).

3) Find the radius from the circle with maximum size cut from the given square with its perimeter of 100cm.

Example 3 Area of a Circle

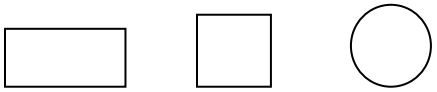
$$S = \pi r^2$$

Note: Exercises were given to "Find the area of a circle, given the radius, diameter, or circumference." Exercises were given to "Find the shaded area" when a circle was inscribed in some certain figures or some figures inscribed in a circle.

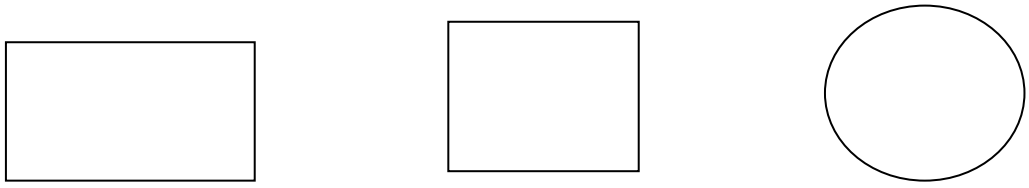
Organize and Review

Note: What had been taught from above was put together along with some word problems. Interestingly enough, one of the word problems was (p.74) as follows:

A square and a rectangle each has the same area of 1,225 cm^2. The area of a circle is 1,256 cm^2. Which one has the biggest perimeter? Which one has the

the second semester. **Example 1** Finding the Area of a Circle Same as in *Course 1* **Example 2** Social Studies Application $A = \pi r^2$ **Example 3** Measurement Application $A = \pi r^2$ *Note*: There were exercises used to find the area or circumference of a circle, given the radius or diameter, and used to find the radius, given the area , but there were no exercises to find the area, given the circumferences. ***Course 3*** **(8th Grade Math Text Book)** **8-3 Circles (p.400)** **Example 1** Finding the Circumference of a Circle *Note*: Same as *Course 1* and *Course 2*. **Example 2** Finding the Area of a Circle *Note*: Same as *Course 1* and *Course 2*. **Example 3** Finding Area and Circumference on a Coordinate Plane *Note*: The section was new to students. **Example 4** Physical Science Application *Note*: In this section, there were exercises used to find the radius of each circle, given the area of a circle, and find the circumference and area of each circle, given the radius or diameter.	*smallest perimeter? If you find the three figures have the same area, can you find the size relationships of their perimeters among the three figures?*  *Note*: The above word problem was a good example to put together what had been taught about *Circles*. Students not only reviewed what they studied about *circles* but also reviewed what they studied about finding the perimeter and the area of a rectangle and square, respectively. Students will also find a radius of the circle whose area is 1,256cm^2. After the radius is found, it is easy to find the diameter and then find the circumference. They will find each perimeter of the three figures above. Now students can find which one has the biggest perimeter and which one has the smallest perimeter.

From the above-mentioned examples of *Circles*, the contrast between the same grade math textbooks of the two countries clearly showed that *Course 1*, *Course 2*, and *Course 3* math textbooks were found an inch deep and a mile wide. The same content area, *Circles*, was spread all through 3 courses, while the Chinese math textbook put *Circles* in the same chapter which was taught at the first semester of 6^{th} grade and *Circles* (regarding how to find *radius, diameter, area, and circumference*) would be never taught in a specific section in upper grades and only revisited or reviewed. Chinese math exercises were much more complicated and difficult besides the exercises just to find the radius or the diameter or the circumference or the area of a circle. In Chinese math textbook, for instance, you would see such examples in the chapter of *Circles* as 1) "Find the radius of a circle, given the circle inscribed in a square with a side length of 10cm." 2) "Find the radius from the circle with maximum size cut from the given square with its perimeter of 100cm." 3) As seen above, "A square and a rectangle each has the same area of 1,225 cm^2. The area of a circle is 1,256 cm^2. Which one has the biggest perimeter? Which one has the smallest perimeter? If you find the three figures have the same area, can you find the size relationships of their perimeters among the three figures?"



Note: *These three figures were shown for Problem 3 above. The figures were not drawn correctly.*

4) There was a wheat field whose length was 100*m long* and whose width was 50*m wide*. If an automatic irrigation sprinkler shot the distance of 10*m*, approximately how many automatic irrigation sprinklers would be needed?(p.74)

In Chinese math textbooks there were listed word problems which students needed to think and apply what was taught to solving the problems. There were no problems with multiple choices. All problems to be solved needed paper and pencil work. That helped teachers to know whether or not students solved problems independently. If the error or mistake was found from students' paper-and-pencil work, a teacher would see why he/she solved the problem incorrectly. Then discussions were to be carried out in or out class so that students would draw a lesson from the mistakes they made. That was why "No Work, No Credit" was often said to students in some CCSD middle schools.

K. Mathematics Textbooks in Some Foreign Countries

In the past few years, much had been mentioned and discussed about Singapore Math, which referred to the mathematics curriculum in the country, whose students achieved the highest scores in the world since 1995. Why has Singapore been in the number one since 1995? It was because Singapore Math, which built on students' prior knowledge and experiences with numbers, was coherent, concrete, and logical, and their "students focus intensely on a handful of topics. This is in contrast to the U.S., where many state standards in set forth dozens of topics to be covered in each grade, with too many objectives,…." [6] Most importantly, Singapore Math had uniform standards. The Ministry of Education had the right to determine what would be taught nationwide. "Singapore Math emphasizes the development of strong number sense, excellent mental-math skills, and a deep understanding of place value." [7] In the United States, "math standards are set at the state level and curriculum choices are made by local school districts. States and local district rely on guidelines provided by the National Council for Teachers of Mathematics (NCTM)."[8] That is to say, the United States had no its own national math curriculum. In July 2001, the new *Compulsory Education Standards for mathematics Curriculum* was promulgated by Chinese Ministry of Education. The new curriculum was focused on fostering "students' interest, innovation, cooperative learning, problem solving and practice" [4] and more knowledge was provided of "number and computation, space and geometry, statistics and probability…", "practical (hands-on) activities and comprehensive applications."[4]

It was also found that American math textbooks were thick and covered too many topics; it usually had more than 800 pages. For example, *Course 1* had 827 pages, *Course 2* had 841 pages, and *Course 3* had 912 pages while math textbooks in many countries with higher mathematics achievement had fewer than 300 pages. In Chinese math textbooks (*People's*

Education Press, Beijing, China2006), 6th grade Chinese math books had 256 pages long with 13 chapters containing 12 sections while *Course 1* had 827 pages long with 14 chapters containing 112 sections. 7th grade Chinese math textbooks (*People's Education Press, Beijing, China 2006*) had 341 pages long with 10 chapters containing 20 sections while *Course 2* had 841 pages long with 12 chapters containing 112 sections. 8th grade Chinese math textbook (*People's Education Press, Beijing, China 2006*) had 332 pages long with 10 chapters containing 30 sections while *Course 3* had 912 pages long with 14 chapters containing 111 sections. Like Singapore, China had national math standards. Chinese math emphasized mastery of math concepts and training students to connect different mathematical ideas using words and word problems with prior knowledge. Chinese math also encouraged students to participation in mental math exercises, solving math problems in their heads without pencil and paper. Chinese math textbooks had 90% of the new contents, and materials studied from previous grades were never re-taught, but only revisited combined with what had been taught while in the U.S. math textbook, about 20 % of the contents were new (as seen from *Course 1*, *Course 2*, and *Course 3*) and repetitions of what had been taught occurred throughout each grade.

Moreover, why were the U.S. math textbooks so thick as compared with Singapore and Chinese Math books? It was because the U.S. math textbooks contained games, multicolored pictures, puzzles, and activities, all of which rarely challenged students. In Chinese math textbooks contained few pictures related to the lesson and no problems asking students to use a calculator to find the answer. Chinese math textbooks presented materials in a logical sequence throughout grades, and expected mastery of the material before students moved to the next level. In Chinese math textbooks there was no key to the answers at the end of each textbook, thus avoiding students just copying the answers for their assignments. For the teachers' part, Chinese

math textbooks were not as friendly as most American math textbooks which provided teachers' solutions and lesson spotlights.

"Japan had a nationally set curriculum," [5] too. Their math textbooks were not as thick as U.S. math textbooks. The success of education system in producing excellent students was also known to all. Like Chinese students, "by the end of grade 4, students were expected to have mastered the four operations of whole numbers and how to effectively apply them" [5] along with the addition and subtraction of decimals and common fractions, because these skills were essential tools for students to move on to upper grade levels. That was why some of the U.S. 6^{th} graders, 7^{th} graders, and 8^{th} graders had difficulty solving problems with fraction, decimals, and integers because they didn't lay a solid math foundation in elementary schools. These students were called academic "Swiss Cheese" from the writer's point of view.

L. Table 4

*en*Vision Math, Nevada Version

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Reteaching

Topic 14 Measurement Units, Time, and Temperature

Review What You Know!

14-1 Measurement: Customary Units of Capacity

14-2 Measurement: Metric Units of Capacity

14-3 Measurement: Units of Weight and Mass

14-4 Measurement: Converting Customary Units

14-5 Measurement: Converting Metric Units

14-6 Measurement: Elapsed Time

Mixed Problem Solving

14-7 Measurement: Elapsed Time in Other Units

14-8 Measurement: Temperature Change

14-9 Problem Solving – Make a Table

Topic 14 Test

Reteaching

Topic 15 Solving and Writing Equations and Inequalities

Review What You Know!

15-1 Algebra: Solving Addition and subtraction Equations

15-2 Algebra: Solving Multiplication and Division Equations

15-3 Algebra: Inequalities and the Number Line

15-4 Algebra: Patterns and Equations

Stop and Practice

15-5 Problem Solving Draw a Picture and Write an Equation

Algebra Connections

Topic 15 Test

Reteaching

Topic 16 Ratio and Percent

Review What You Know!

16-1 Number: Understanding Ratios

16-2 Number: Understanding Percent

16-3 Number: Percent, Fractions, and Decimals

16-4 Number: Finding Percent of a Whole Number

16-5 Problem Solving – Make a Table and Look for a Pattern

Topic 16 Test

Reteaching

Topic 17 Equations and Graphs

Review What You Know!

17-1 Number: Understanding Integers

17-2 Algebra: Ordered Pairs

Enrichment

17-3 Algebra: Distances on Number Lines and the Coordinate Plane

17-4 Algebra: Graphing Equations

17-5 Problem Solving Work Backward

Topic 17 Test

Reteaching

Topic 18 Graphs and Data

Review What you Know!

18-1 Statistics: Data from Surveys

18-2 Statistics: Bar Graphs and Picture Graphs

18-3 Statistics: Line Graphs

Go Digital

18-4 Statistics: Stem-and-Leaf Plots

Enrichment

18-5 Statistics: Histograms

18-6 Statistics: Circle Graphs

Enrichment

18-7 Statistics: Mean

18-8 Statistics: Median, Mode, and Range

18-9 Problem Solving Make a Graph

Topic 18 Test

Reteaching

Topic 19 Transformations, Congruence, and Symmetry

Review What You Know!

19-1 Geometry: Translations

Going Digital

19-2 Geometry: Reflections

19-3 Geometry: Rotations

19-4 Geometry: Congruence

M. Table 5

Chinese 6th Grade Math

(*Translated by the Writer*)

Semester 1

Table of Contents

Chapters

M. Table 5

Chinese 6th Grade Math, Continued

(*Translated by the Writer*)

Semester 2

Table of Contents

Chapters

N. Table 6

Chinese 7th Grade Math

(*Translated by the Writer*)

Semester 1

Table of Contents

Chapters

N. Table 6

Chinese 7th Grade Math, Continued

(*Translated by the Writer*)

Semester 2

Table of Contents

Chapters

N. Table 6

Chinese 7th Grade Math, Continued

(*Translated by the Writer*)

Semester 2

Table of Contents

Chapters

O. Table 7

Chinese 8th Grade Math

(*Translated by the Writer)*

Semester 1

Table of Contents

Chapters

O. Chinese 8th Grade Math, Continued

(*Translated by the Writer)*

Semester 2

Table of Contents

Chapters

Chapter V

Conclusion

The writer analyzed Mathematics Text Books *Course 1*, *Course 2*, and *Course 3* (Holt, Nevada Edition, 2007) used in some of Clark County Schools District (CCSD) middle schools. It was found that the textbooks were "an inch deep and a mile wide." Some of the contents were repeated being taught from *Course 1* through *Course 3* as shown in Table 1B (on page 43) , Table 2B (on page 107), and Table 3 (on page 166). However, students still did not master them. Therefore, those students became academic "Swiss Cheese" students. U.S. middle school students were still studying what they were supposed to have mastered in elementary schools. They still studied order of operations, four operations of whole numbers, fractions, decimals, basic equations, *etc.* while students of the same grade in other countries moved on to algebra and geometry and trigonometry topics. "U.S. standards are unfocused and aimed at the lower common denominator. In other words, they are a mile wide and an inch deep."[9]

From *Course1, Course 2*, and *Course 3*, it was found that many topics were highly repetitive. Professor Schimidth, *et al* pointed out, "The average duration of a topic in US is almost 6 years (!) versus about 3 years in the best-performing countries. Lots of spiraling and reviewing is done. We introduce topics early and then repeat them year after year. To make matters worse, very little depth is added each time the topic is addressed because each year we devote much of the time to reviewing the topic." [10]

The writer found that some of the elementary schools in CCSD) used *enVision Math* textbook for 5th graders. The writer perused the math book borrowed from his neighbor's daughter, who studied in a CCSD elementary school. To the writer's surprise, the *enVision Math*

textbook nearly covered every content that *Course 1*, *Course 2*, and even *Course 3* had (See Table 4 for the contents of *enVision Math* on page 198). If students completed and mastered that math book by the end of 5th grade in elementary schools, the number of students academic achievement in CCSD middle schools would be much higher because they, from elementary schools, laid a good academic foundation to move on, and their academic life in a middle school would be easier. From the contents of *enVision Math* text book, it was clearly shown that what students were taught in 5th grade. Unfortunately, the writer was told that the *enVision Math* textbook was not used so often in that elementary school. Instead, the teacher selected materials from other math books or other math resources for students to study. The writer thought that *enVision* Math textbook was perfect for 5th graders, because it would help students to move on to upper math study for a middle school and even a high school. *enVision Math* text book had 519 pages long with 20 chapters containing 124 sections. Luckily, the textbook, unlike other textbooks, did not have a key to the answers at the end of the book, thus avoiding students copying the answers while they worked on assignments. It was hoped that students would be taught to the mastery level, because all contents that covered would build the foundation for middle school math and high school math. However, the writer was in doubt whether 5th grade students could be taught to the mastery level because there were still so many chapters to be covered in a year. The contents of the math book was good from the writer's point of view, but the questions were, "Do the 5th graders have such ability as to use the book if they did not master what was supposed to study in previous grades?" "Can the 5th graders complete and master what the book was designed?" because *en*Vision math book covered a lot of contents. If 5th graders were able to complete and master the concept of mathematics set forth in *en*Vision Math textbook in a year, they would feel much comfortable to study Pre-algebra or Algebra I in a

middle school, thus eliminating a great amount of repetition, and definitely improving academic achievement, and dabsolutely raising the academic achievement bar in CCSD. It was wondering whether or not the district had a "ruler" to measure students' achievement after *enVision* math textbook was used.

Schmidt pointed out that "It is in middle school that American students fall behind their peers in other countries. They never make up that deficit, and in fact fall further behind in high school. The only way we could make it up is for the rest of the world to stand still. Then we would catch up." [11] Schmidt also made clear that "fixing the problem belies simplistic solutions, such as imitating the curricula or instructional practices of successful nations or assigning more homework."[11]

"The only way to fix the problems inherent in U.S. mathematics and science education is to adopt system-wide changes."[12] It was suspected that *Course 1*, *Course 2*, and *Course 3* were compiled on the basis of Nevada State math curriculum. If there were some contents disproportionally or illogically distributed amongst these three math books, then the state math curricula must be re-written from K-12. Recently, Dr. Keith Rheault, Superintendent of Public Instruction of Nevada State, announced that Nevada joined with other 48 states and adopted a draft of Common Core State Standards of English language arts and mathematics. He provided a video introduction of the rollout of the Common Core State Standards in Nevada.**[15]** The Common Core State Standards Initiative pointed out:

> The Common Core State Standards provide a consistent, clear understanding of what students are expected to learn, so teachers and parents know what they need to do to help them. The standards are designed to be robust and relevant to the real world, reflecting the knowledge and skills that our young people need for success in college and careers. With American students fully prepared for the future, our communities will be best positioned to compete successfully in the global economy.[13]

The Mathematics Standards of the Common Core State Standards were better than the curricula each state or local districts used. The Mathematics Standards showed each grade (K-12) level standards. The writer copied the table of these standards from 5th grade to 8th grade as follows:

5th grade

• Introduction

• Operations & Algebraic Thinking

• Number & Operations – Fractions

• Measurement & Data

• Geometry

6th Grade

• Introduction

• Ratios & Proportional Relationships

• The Number System

• Expressions & Equations

• Geometry

• Statistics & Probability

7th Grade

• Introduction

• Ratios & Proportional Relationships

• The Number system

• Expressions & Equations

• Geometry

• Statistics & Probability

8th Grade

• Introduction

• The Number System

• Expressions & Equations

- Functions
- Geometry
- Statistics & Probability

The Math Standards had 93 pages long. The details of the Common Core State Standards for Mathematics could be found at the following web:

http://corestandards.org/assets/CCSSI_Math%20Standards.pdf

As is known to all, changes/reform would cause infliction of "pains," but in the long run, the changes/reform would bring great gains. It was hoped that the future state /local mathematics standards would be set forth based on the Common Core State Standards.

In the future studies, examination of U.S. students' academic math performance and achievement are indicated.

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