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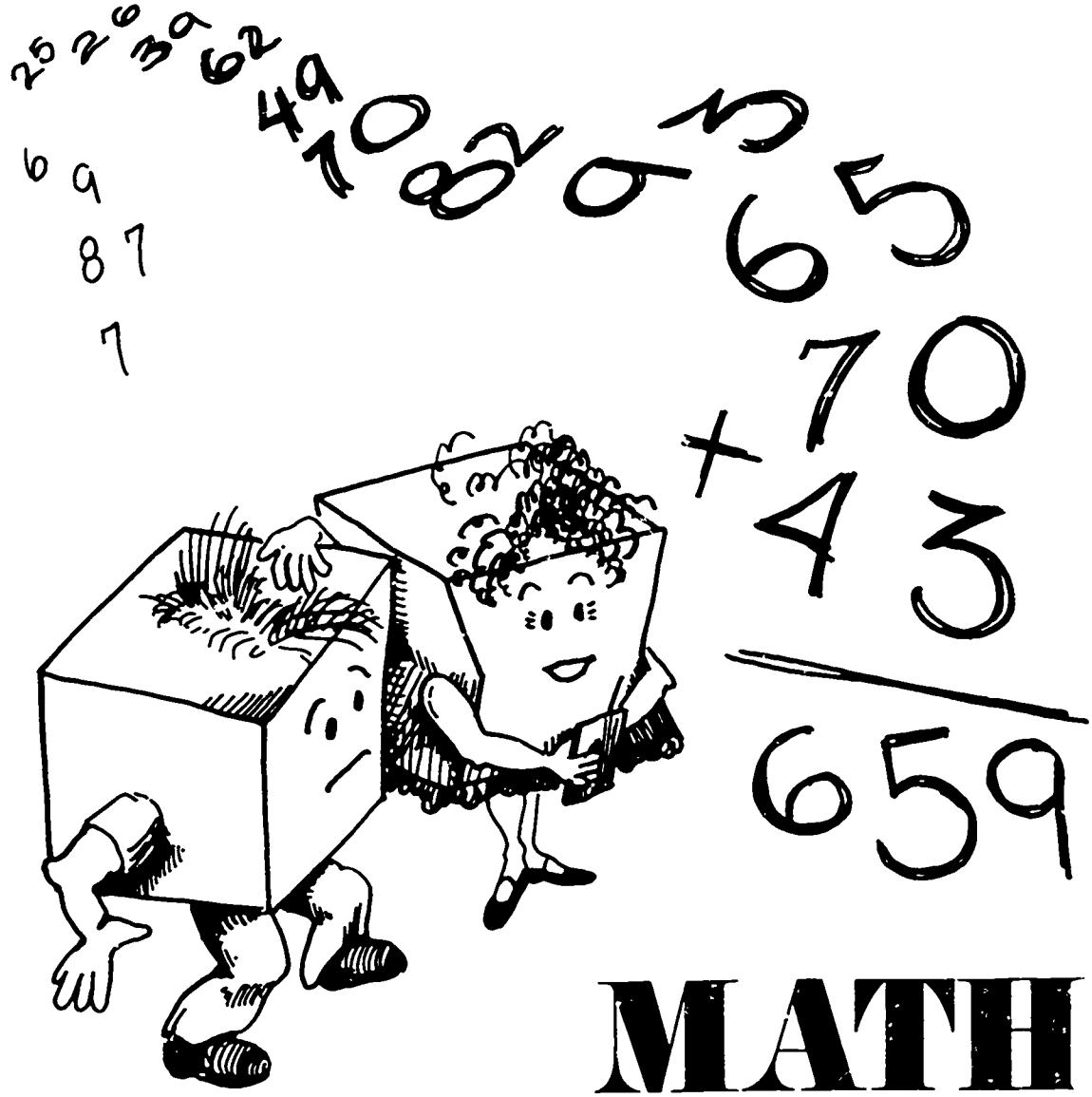
ABSTRACT

This secondary unit of instruction on mathematics is one of sixteen Common Core Units in Business Education (CCUBE). The units were designed for implementing the sixteen common core competencies identified in the California Business Education Program Guide for Office and Distributive Education. Each competency-based unit is designed to facilitate personalized instruction and may include five types of materials: (1) a teacher's guide, which provides specific strategies for the units as well as suggestions for the use of the materials; (2) a student manual, which directs the student through the unit's activities and jobs and brings the student to the competency level for the unit; (3) working papers, which are consumable materials used in completing the jobs and activities described in the student manual; (4) pre/post tests and quizzes; and (5) suggested electronic media. A strategies manual and the California Business Education Program Guide and supplements are also available--see note. (IRA)



MATH COMPUTATIONS

COMMON CORE UNITS IN BUSINESS EDUCATION

MATH

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REVIEW OF MATHEMATICAL TERMS

1. ADDEND — number added in an addition problem
2. SUM — total or answer in an addition problem

46 addend
12 addend
74 addend
43 addend
175 sum or total

3. MINUEND — number from which another number is subtracted in a subtraction problem
4. SUBTRAHEND — number that is subtracted from the minuend in a subtraction problem
5. DIFFERENCE OR REMAINDER — answer in a subtraction problem.

94 minuend
31 subtrahend
63 difference or remainder

6. CREDIT BALANCE — is a negative difference or remainder in a subtraction problem. It occurs whenever the subtrahend is larger than the minuend.

40 minuend
72 subtrahend
32 difference or remainder (credit balance)

7. MULTIPLICAND — number that is multiplied in a multiplication problem
8. MULTIPLIER — number that one multiplies by in a multiplication problem.
9. PRODUCT — the answer in a multiplication problem

72 multiplicand
x13 multiplier
936 product

10. DIVIDEND — number into which another number is divided in a division problem
11. DIVISOR — number that is divided into the dividend in a division problem
12. QUOTIENT — the answer in a division problem
13. REMAINDER — number which remains in a division problem if the divisor will not go into the dividend an even number of times.

5 quotient
7 / 37 dividend
35
2

14. NUMERATOR — the top part of a fraction 2
15. DENOMINATOR — the bottom part of a fraction 3

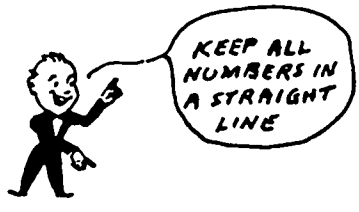
WHOLE NUMBERS

Addition Of Whole Numbers

The most common function in mathematics is addition. You will use it regularly on almost any job that you may have in the future. You will also use addition regularly in your day-to-day activities.

Objective: Given 10 problems with each problem containing no more than six items composed of two to five digits, you will add whole numbers with at least 80% accuracy.

When you write numbers down to be added, you should write them in columns which are even on the right-hand side. If the numbers to be added are written in uneven columns, it is easy to get into the wrong column while adding. This may cause you to get a wrong answer. The sample problems in the illustration below show the correct and incorrect way of writing down the numbers.



34	34
8,457	8,457
2,268	2,268
495	495
852	852
Incorrect	Correct

You can easily add the numbers when they are written as shown in the illustration on the right. Using a sheet of scratch paper, list the numbers in the illustration above. Be sure that the numbers are written in neat, even columns.

Add the numbers in the following manner:

a. Start at the top of the right-hand column and add down.
4 + 7 + 8 + 5 + 2 = 26. The answer is 26.

b. Write down the 6 under the first column on the right. Example $\underline{\quad 6}$

c. Carry the 2 over to the next column to the left and add it plus the other numbers in that column. 2 + 3 + 5 + 6 + 9 + 5 = 30.

d. Write the 0 under the second column. Example $\underline{\quad 06}$

e. Carry the 3 to the next column and add. 3 + 4 + 2 + 4 + 8 = 21.

f. Write the 1 under the column just added. Example $\underline{\quad 106}$

g. Carry the 2 to the next column to the left and add. 2 + 8 + 2 = 12.

h. Write the 12 under the column just added. Example $\underline{\quad 12,106}$

i. The correct answer is 12,106. This is called the *sum*.

To check the accuracy of your work, you may re-add the problem starting at the bottom of each column and adding up.

Another way to check your work is to add each column again starting at the bottom and write down your answer as illustrated below:

2 + 5 + 8 + 7 + 4	=	26
5 + 9 + 6 + 5 + 3	=	28
8 + 4 + 2 + 4	=	18
2 + 8	=	10
Add the totals for each column. The sum is		12106

This should be the same answer you got when you added the columns down.

Activity 1

Practice adding each of the problems for Activity 1 on page 1 of the Working Papers. Be sure to check your answers by re-adding the problem from the bottom up.

Subtraction of Whole Numbers

Objective: Given 10 problems with each number containing between two and five digits, subtract whole numbers with at least 80% accuracy.

Subtraction is the process of taking a number from a larger number. If you take a number of items from a group to find out how many are left, the answer is called the *remainder*. If you wish to compare two groups, you may subtract the smaller from the larger and the answer is called the *difference*. For example:

If you have 24 pencils and you sold 16, you would subtract 16 from 24 to find out how many you have left. 24 – 16 = 8 or the *remainder*. If you have 15 pencils and need 24, you would subtract 15 from 24 to find out how many more you need. 24 – 15 = 9 *difference* or the number you need.

The numbers in a subtraction problem have names as follows:

The larger or top number	428	is called the *minuend*.
The number to be subtracted	146	is called the *subtrahend*.
The answer	282	is called the *remainder* or *difference*.

When you added numbers, you found it was necessary to carry a number from one column to the next. When you subtract it is necessary to borrow from the column to the left when the smaller of two numbers to be subtracted is in the minuend or top number.

Now let's try a problem and see how it works. Subtract 237 from 562. Example: 562
- 237

a. You can subtract in only one column at a time starting with the right-hand column and working toward the left.

b. You immediately find that you cannot subtract 7 from 2 because 7 is the larger number

c. It is necessary then to borrow 10 by taking a 1 from the top number (6) in the second column. This makes the "2" a "12" and you can now subtract the 7. 12 – 7 = 5.

d. The 5 is written under the first column. Example 562
- 237
5

e. You are now ready to subtract the second column. Since you borrowed "1" from the "6", it has been reduced to a five.

f. Subtract 3 from 5 or 5 – 3 = 2. Write this under the second column.

Example
$$\begin{array}{r} 562 \\ -\ 237 \\ \hline 25 \end{array}$$

g. Since you did not need to borrow this time, the next column is unchanged and you may subtract 2 from 5 or 5 – 2 = 3. This is written in the answer as

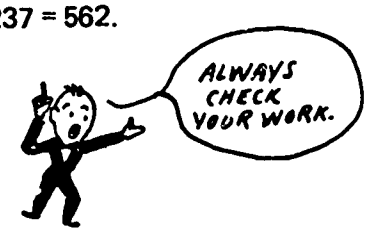
$$\begin{array}{r} 562 \\ -\ 237 \\ \hline 325 \end{array}$$

The difference or remainder is 325.

h. When you have to borrow, it may help to write little numbers to indicate the changes as illustrated below.

$$\begin{array}{r} {\scriptstyle 5\ 12} \\ 5\not{6}2 \\ -\ 237 \\ \hline 325 \end{array}$$

Checking your work in subtraction is easy. To check your answer add the remainder or difference (325) to the subtrahend (237) and the answer should equal the minuend (562). 325 + 237 = 562.



$$\begin{array}{r} 583 \text{ minuend} \\ -\ 348 \text{ subtrahend} \\ \hline 235 \text{ remainder} \end{array}$$

Check

$$\begin{array}{r} 348 \text{ subtrahend} \\ +235 \text{ remainder} \\ \hline 583 \text{ minuend} \end{array}$$

Activity 2

Turn to Activity 2 on page 2 of the Working Papers and do each of the subtraction problems. Prove your answers by adding the subtrahend and the remainder together. Your answer should equal the minuend as shown in the example above.

STOP!

You have now had a review of basic addition and subtraction of whole numbers. You will find it helpful to check your progress at this point. Do this by completing the progress self test as directed in Activity 3 on the following page.

Activity 3

Turn to Activity 3 on page 3 of the Working Papers. This is a progress test. Complete the test, prove your answers and then check them against the answers in the key on page 32. If you got 80% (8 problems) or more correct, you are ready to move on to multiplication. If not, talk to your teacher. You may need to do some more practice problems until your skill improves.

Multiplication Of Whole Numbers

You now have demonstrated to yourself that you can add and subtract whole numbers. Multiplication is simply repeated addition. It sounds hard, but if you follow each step carefully, you will discover it is not so difficult.

Objective: Given 10 problems with each number containing three digits or less, multiply whole numbers with at least 80% accuracy.

Multiplication is simply repeated addition. For example, four times eight means you need to add eight, four times.

$$\begin{array}{r} 8 \\ +8 \\ +8 \\ \underline{+8} \\ 32 \end{array} \quad \text{or} \quad 4 \times 8 = 32$$

If a number is large such as 348 times 75, it would be very difficult to add 348, seventy-five times. Therefore, you can simplify the problem by multiplying. Multiplication problems have three parts as shown below:

128	multiplicand
x34	multiplier
4552	product (answer)

Before you get too involved in multiplication, it will be helpful to review a few multiplication facts.

1. Any number multiplied by zero (0) is zero.

$1 \times 0 = 0$
$2 \times 0 = 0$

3	12	57
x0	x0	x0
0	0	0

2. Any number multiplied by 1 remains the same.

1 x 1 = 1	3	12	57
1 x 2 = 2	x1	x1	x1
	3	12	57

3. Whenever you multiply a whole number by 2, the number is doubled and the answer is always an even number.

11	31	47	76	93
x2	x2	x2	x2	x2
22	62	94	152	186

Now, let's see how multiplication works by going through some examples in detail. Work from right to left just as you did in addition.

1. 24
   x7

   a. Multiply 7 x 4 (7 x 4 = 28)
   b. Write down the 8 and carry the 2.

   ```
   24
   x7
   ---
    8
   ```

   c. Multiply 7 x 2 and add the 2 that you carried. 7 x 2 = 14 + 2 = 16.
   d. Write down the 16.

   ```
   24
   x7
   ---
   168
   ```
   product

2. 386
   x43

   a. Multiply 3 x 6 = 18.
   b. Write down the 8 below the number by which you multiplied (3) and carry the 1.

   ```
   386
   x43
   ---
    8
   ```

   c. Multiply 3 x 8 = 24 and add the 1 you carried. 24 + 1 = 25.
   d. Write down the 5 and carry the 2.
   e. Multiply 3 x 3 and add the 2. 3 x 3 = 9 + 2 = 11.
   f. Write down the 11

   ```
   386
   x43
   ---
   58
   ```

   ```
   386
   x43
   ---
   1158
   ```

   g. Now it is necessary to repeat the same process with the "4" in the multiplier. Multiply 4 x 6 = 24.
   h. Write down the 4 and carry the 2. Note: Write the 4 down directly below the 4 by which you multiplied

   ```
   386
   x43
   ---
   1158
    4
   ```

   i. Multiply 4 x 8 and add the 2 that was carried. 4 x 8 = 32 + 2 = 34

j. Write down the 4 and carry the 3.

```
  386
 x43
1158
  44
```

k. Multiply 4 x 3 and add the 3. 4 x 3 = 12 + 3 = 15.

l. Write down the 15. You have multiplied the last digit so there is no need to carry.

```
  386
 x43
1158
1544
```

m. Add the two partial products together.

```
  386
 x43
1158
1544
16,598 product
```

Now you should do some practice problems to be sure you understand the process and to develop your skill.

Activity 4

Turn to Activity 4 in the Working Papers on page 4 and find the product (answer) for each problem. When finished, check your answers with those on page 32.

Division Of Whole Numbers

Division is repeated subtraction, just as multiplication is repeated addition. But if we subtract it becomes a long process. For example, how many times can you subtract 15 from 345? The easiest way to find the answer is by division.

Objective: Given 10 problems with each divisor containing no more than three digits or less, multiply whole numbers with at least 80% accuracy.

A division problem has three parts: the divisor, the dividend, and the quotient (answer). To do a division problem these parts are arranged as follows:

```
                quotient (answer)
divisor  ⟌  dividend
```

The problem may be expressed as 345 ÷ 15 which is then written:

345 divided by 15 = $15\overline{)345}$
Dividend ÷ divisor = quotient.

Now let's see what you need to do to solve this problem.

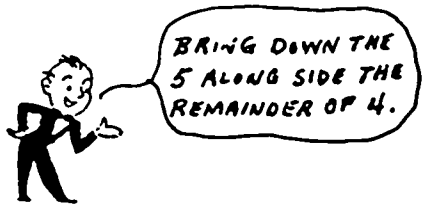
a. First you need to determine how many times 15 will go into 3. It will not got into 3, so you must also use the next digit (4).
b. How many times will 15 go into 34, or how many times can you subtract 15 from 34?
c. 15 will go into 34 two times. Write the 2 above the 4 in the dividend as shown and write 2 x 15 or 30 directly below the 34.

$$\begin{array}{r} 2 \\ 15\overline{)345} \\ 30 \end{array}$$

d. Draw a line and subtract the 30 from 34.

$$\begin{array}{r} 2 \\ 15\overline{)345} \\ \underline{30} \\ 4 \end{array}$$

e. You have a remainder of 4. Bring down the next digit (5) along side the 4 making it a 45.



$$\begin{array}{r} 2 \\ 15\overline{)345} \\ \underline{30} \\ 45 \end{array}$$

f. How many times will 15 go into 45? 15 goes into 45 three times. Write the 3 above the 5 in the dividend and write 3 x 15 or 45 directly below the 45.

$$\begin{array}{r} 23 \\ 15\overline{)345} \\ \underline{30} \\ 45 \\ \underline{45} \end{array}$$

g. The problem comes out even so there is no remainder. The quotient (answer) is 23.

Not all problems will come out even as in the previous example. When an amount is left over, it is called the remainder. Let's try another problem that will end with a remainder.

6085 ÷ 25 = or $25\overline{)6085}$

a. 25 goes into 60 two times.

$$\begin{array}{r} 2 \\ 25\overline{)6085} \\ \underline{50} \\ 108 \end{array}$$

b. A remainder of 10 is left over. The next digit (8) is brought down to make 108.

c. 25 goes into 108 four times.

$$\begin{array}{r} 24 \\ 25\overline{)6085} \\ \underline{50} \\ 108 \\ \underline{100} \\ 85 \end{array}$$

d. This time a remainder of 8 is left and the next digit (5) is brought down to make 85.

e. 25 goes into 85 three times.

$$\begin{array}{r} 243 \\ 25\overline{)6085} \\ \underline{50} \\ 108 \\ \underline{100} \\ 85 \\ \underline{75} \\ 10 \end{array}$$

f. A remainder of 10 is left. It may be written as R10 to the right of the quotient.

$$\begin{array}{r} 243\ R10 \\ 25\overline{)6085} \end{array}$$

Activity 5

Turn to Activity 5 on page 5 of the Working Papers. Solve each of the division problems as explained above. Check your answers with those on page 32.

STOP!

It would be a good idea for you to check your progress again. You can do this by completing the self-test as directed in Activity 6 on the following page.

Activity 6

Turn to Activity 6 on page 6 in the Working Papers. Complete the self-test and then check your answers with those on page 32. If you got 80% (8 problems) or more correct, you are ready to move on to the next unit. If not, talk to your teacher about the problems you missed. You may need to do more practice problems until your skill improves.

FRACTIONS

It is necessary to sometimes express something in mathematical terms which is less than a whole number. For example: 1/2 of an apple or 3/4 pound of candy. Sometimes it may be necessary to express some things in terms of both a whole number and a fraction, such as a 3-1/2 pound beef roast or 24-3/4 miles to the next town. These are referred to as mixed numbers.

Addition Of Fractions

Objective: Given 10 problems with each problem containing no more than 5 items, add common fractions with at least 80% accuracy. Any fractions in the answer should be reduced to their lowest terms.

Before fractions can be added they must all have the same demonimator. This is called a *common* denominator.

If all fractions to be added have the same (common) denominator, addition is done by adding together the numerators. For example:

1/8 + 7/8 + 3/8 + 5/8 = 16/8 or 2
1/9 + 5/9 + 4/9 + 7/9 = 17/9 or 1-8/9

When adding fractions together and when the sum of the numerator is more than the denominators, the answer should be reduced to its lowest terms. You can do this by dividing the numerator by the denominator as illustrated on the following page.

```
               2                      1
16/8 =   8 / 16  or 2     17/9 =  9/ 17  or 1-8/9
                                      9
                                     ---
                                      8
```

In many cases you will find that fractions do not have common denominators. When this happens, you must change the denominators so that they are all the same. For example:

1/2 + 2/3 + 3/4 + 5/6 =

The lowest common denominator for these fractions is 12. Therefore, you must multiply both the numerator and denominator by a number which will change the denominator to 12, as follows:

1/2 x 6/6 = 6/12	Note that 6/6, 4/4, 3/3 and 2/2 are all equal to 1.
2/3 x 4/4 = 8/12	Multiplying a number by 1 does not change the number. The result
3/4 x 3/3 = 9/12	then is that you have changed the numerators and denominators
5/6 x 2/2 = 10/12	but you have not changed the numeric value of the fraction.

Now you can add these fractions together as follows:

```
                                                 2
6/12 + 8/12 + 9/12 + 10/12 = 33/12 =   12/ 33    =  2-9/12 which can be reduced
                                           24          to 2-3/4.
                                          ----
                                          9/12
```

A fraction in your answer should be reduced to its lowest terms. For example:
1/2 + 3/4 + 1/12 = 6/12 + 9/12 + 1/12 = 16/12

16/12 can be reduced to a whole number and a fraction as shown below.

```
            1
16/12 = 12/ 16 or 1-4/12
            12
           ----
           4/12
```

The 4/12 can be reduced to its lowest terms.

$4/12 = \frac{4 \div 4}{12 \div 4} = \frac{1}{3}$

The final answer should be written as 1-1/3.

If a particular amount contains both a whole number and a fraction, it is referred to as a *mixed number*. When you add mixed numbers, the same rules apply. The fraction portion of the numbers must have common denominators. Then the fractions and the whole numbers are added separately and then combined as shown on the following page.

$$\begin{array}{rcrcl} 5\text{-}5/6 & & 5\text{-}5/6 & & \\ +\ 8\text{-}4/6 & = & +\ 8\text{-}4/6 & = & 13 + 9/6 \text{ or } 13 + 1\text{-}1/2 = 14\text{-}1/2 \\ & & 13\ 9/6 & & \end{array}$$

Now try your hand at adding the fractions and mixed numbers in Activity 7.

Activity 7

Turn to Activity 7 on page 7 in the Working Papers. Find the sum or total for each problem. Check your answers with those on page 32.

Subtraction Of Fractions

Objective: Given 10 problems containing fractions, subtract common fractions with at least 80% accuracy. Any fractions in the answer should be reduced to its lowest terms.

If you can add fractions, you will find subtracting fractions is just as easy. The same rules apply as they did in addition. Before you can subtract fractions or mixed numbers, they must have common denominators. For example:

$$\begin{array}{rcrcrcr} 1/3 & & 4/6 & & 12\text{-}5/8 & & 11\text{-}13/8^* & & 15\text{-}1/3 & & 14\text{-}16/12 \\ -\ 1/2 & = & -\ 3/6 & & -\ 6\text{-}3/4 & = & -\ 6\text{-}\ 6/8 & & -\ 9\text{-}3/4 & = & -\ 9\text{-}\ 9/12 \\ & & 1/3 & & & & 5\text{-}\ 7/8 & & & & 5 - 7/12 \end{array}$$

*Note: Since 5/8 is less than 3/4, it is necessary to borrow 1 from the 12 and add 1 or 8/8 to 5/8 which equals 13/8 before you can subtract.

Activity 8

Turn to Activity 8 on page 8 in the Working Papers. Find the difference for each problem. Check your answers with those on page 31.

Multiplication Of Fractions

Objective: Given 10 problems containing fractions, multiply common fractions and reduce any fractions in the answer to its lowest possible terms with at least 80% accuracy.

Multiplying fractions is quite simple. You multiply the numerators and then the denominators. The fraction in the product should be reduced to its lowest terms.

$4/5 \times 3/5 = \frac{4 \times 3}{5 \times 5} = \frac{12}{25}$

$7/8 \times 4/7 = \frac{7 \times 4}{8 \times 7} = \frac{28}{56}$ or $\frac{1}{2}$

$1/2 \times 2/3 \times 3/4 = \frac{1 \times 2 \times 3}{2 \times 3 \times 4} = \frac{6}{24}$ or $\frac{1}{4}$

If the numbers to be multiplied contain mixed numbers, the mixed numbers must be changed to improper fractions. Improper fractions have numerators which are larger than the denominator. In the problem 3/5 x 4- 3/4, the 4 -3/4 must be changed to an improper fraction as follows:

4 -3/4 is the same as 4/1 and 3/4. The 4/1 can be changed to 4ths by multiplying both the numerator and the denominator by 4.
4/1 x 4/4 = 16/4. 4 -3/4 thus is equal to 16/4 + 3/4 or 19/4. Now you can multiply.

3/4 x 4 -3/4 =

$\frac{3 \times 19}{4 \times 4} = \frac{57}{16}$ or $16\overline{)57}$ (3, remainder 48) = 3 - 9/16

Activity 9

Follow these same procedures as you do the problems in Activity 9 on page 9 of the Working Papers. Find the product in each of the problems. Check your answers with those on page 32.

Division Of Fractions

Objective: Given 10 problems containing fractions, divide common fractions and reduce any fraction in the answer to its lowest terms with at least 80% accuracy.

Once you have learned to multiply fractions, you will find division of fractions is done by inverting (turning over) the fraction and multiplying just as you did in multiplication. Look at the following examples:

2/5 ÷ 3/8 = 2/5 x 8/3 = 16/15 or 1 -1/15
3/4 ÷ 7/8 = 3/4 x 8/7 = 24/28 or 6/7
2 -1/2 ÷ 3/5 = 5/2 x 5/3 = 25/6 or 4 -1/6
5 -7/8 ÷ 2 -2/5 = 47/8 x 5/12 = 235/96 or 2 -43/96

Now try your hand with the problems in Activity 10

Activity 10

Find the quotient for each of the problems in Activity 10 on page 10 in the Working Papers.

STOP!

Now is a good time to check your progress again. Activity 11 is a self-test on everything you have covered so far.

Activity 11

Turn to Activity 11 on page 11 in the Working Papers. Complete the self-test and then check your answers with those on page 33. If you get 80% (8 problems) or more correct, you are ready to move on to the next unit. If not, talk to your teacher about the problems you missed.
NOTE: If most of the problems you missed required similar functions, you may need to go back and do more practice problems of that type.

DECIMALS

Fractions represent a part of a whole number. Decimals are another way of representing a part of a whole number. Decimals are fractions with the denominator expressed as 10, 100, 1,000, etc. This is shown by the use of a decimal point and the number of digits to the right of the decimal point. For example, the following fractions can be written as decimals in the following manner:

1/10	=	.1
1/100	=	.01
1/1000	=	.001
1/10,000	=	.0001

A fraction may be converted to a decimal by dividing the numerator by the denominator. (This requires division with decimals which will be explained in detail later.) Other fractions may be written as decimals as shown below:

1/8	=	.125
1/6	=	.1667
3/8	=	.375
1/4	=	.25
2/3	=	.667

The money system you use is based on the decimal system. When you see a price quoted as $3.25, it means that item costs 3 1/4 dollars. You will find it is much easier to work with fractional parts when they are written as decimals. When you work in an office, you will use an adding machine or calculator for most of your mathematical problems. These machines cannot handle common fractions. Since they can only handle decimal fractions, you will need to convert common fractions to decimals before you can use the machine.

Addition Of Decimals

Objective: Given 10 problems with each problem containing no more than 5 items consisting of whole numbers and decimals, add the numbers with at least 80% accuracy.

When you list numbers with decimals, always keep the decimal points in line vertically. The decimal point in the answer is placed directly below the column of decimal points in the numbers to be added. Whole numbers (numbers without decimals) are always written to the left of the column of decimal points. A decimal point and zeros to the right may be added to fill out the columns if you desire. Adding zeros to the right of the decimal point does not change the value of the number.

Once you get decimal numbers listed with the decimal points in line, addition is done the same as in addition of whole numbers. The illustration below shows how numbers should be written for addition. Bring the decimal straight down in the answer.

54.50		54.500
48.		48.000
132.256	or	132.256
28.07		28.070
262.826		262.826

Activity 12

Turn to Activity 12 on page 12 in the Working Papers. Practice adding each problem and then check your work by adding from the bottom up.

Subtraction Of Decimals

Objective: Given 10 problems consisting of whole numbers and decimals, subtract the numbers with at least 80% accuracy.

Now that you can add decimals, you will find that subtraction is just as easy. In subtraction the decimal points must be in line, just as in addition. Look at the problems in the illustration below. You will see that subtraction is done just as it was with whole numbers. The decimal point is placed in the answer directly below the decimal points in the numbers to be subtracted.

8.45	26.	96.06	125.00
- 3.21	- 12.5	- 57.14	- 67.93
5.24	13.5	38.92	57.07

Activity 13

Do the problems in Activity 13 on page 13 of the Working Papers. Check your work by adding the remainder and subtrahend together. The total must equal the minuend.

Multiplication Of Decimals

Objective: Given 10 problems consisting of whole numbers and decimals, multiply to find the products and mark off the correct number of decimal places with at least 80% accuracy.

Multiplication of numbers with decimals is basically no different than multiplying whole numbers. The numbers are multiplied just as they would be if the decimal points were not there. The difference is in placing the decimal point after the product has been obtained.

To place the decimal point in the product, you must count the number of digits to the right of the decimal point in both the multiplicand and multiplier and then count off an equal number of digits in the product starting on the right and counting toward the left.

7.818	3 digits to right of decimal
x 35.6	1 digit to right of decimal
278.3208	4 digits marked off in product

Activity 14

Find the product for the problems in Activity 14 on page 14 in the Working Papers.

Division Of Decimals

Objective: Given 10 problems, find the quotient in a series of problems including whole numbers and decimals and mark the correct number of decimal places in the answer with at least 80% accuracy.

Here again the mathematical process remains the same as it was when you divided whole numbers. The difference is in the handling of the decimal point.

If the divisor is a whole number, you can divide just as you did with whole numbers. *Place the decimal in the answer directly above the decimal point in the dividend.*

$$\begin{array}{r} 8.7 \\ 4\overline{)\,34.8} \\ \underline{32} \\ 28 \\ \underline{28} \end{array}$$

If the divisor is a decimal, you must make it a whole number by moving the decimal point to the right. When this is done, you must also move the decimal point in the dividend the same number of places to the right, as shown in the examples below. (NOTE: If the dividend is a whole number, you must add zeros to the right in order to move the decimal point.)

$$\begin{array}{r} 245.36 \\ 12\overline{)\,2944.32} \end{array} \qquad \begin{array}{r} 248. \\ 13.75\overline{)\,3410.00} \end{array}$$

Sometimes in dividing the quotient does not come out even. The fractional part of the answer is shown as a decimal. When this is necessary, you will have to add zeros to the right of the decimal in the dividend in order to carry the answer out to the required number of decimal places. Study the following illustrations.

$$75\overline{)2562.0}\,0 = 341.6 \qquad 16\overline{)87.50000} = 5.46875$$

Even when dividing whole numbers, you may have a remainder that you can show as a decimal. Look at the examples below.

$$8\overline{)30.00} = 3.75 \qquad 12\overline{)435.00} = 36.25$$

Activity 15

Find the quotient for the problems in Activity 15 on page 15 in the Working Papers.

Converting Fractions To Decimals

Objective: Given 10 problems, convert fractions to decimals with at least 80% accuracy.

Earlier you were told that fractions needed to be converted to decimals before they can be used on a machine. To convert fractions to decimals you divide the numerator by the denominator as shown below:

$1/2 = 2\overline{)1.0} = .5$ $\quad 1/4 = 4\overline{)1.00} = .25$ $\quad 3/8 = 8\overline{)3.000} = .375$

$4/5 = 5\overline{)4.0} = .8$ $\quad 7/8 = 8\overline{)7.000} = .875$ $\quad 3/32 = 32\overline{)3.00000} = .09375$

Sometimes a decimal fraction will not come out even no matter how many places it is carried out. When this happens, you will be told or you must decide how many places you need to carry out the quotient. For example, if you try to convert 1/3 to a decimal, your answer will be .3333333,

et. The farther the digits get to the right of the decimal point, the less important they are. This means you can drop some of those digits and still assume the answer is correct enough to use. As in the example above, 1/3 can be converted and used as .33, .333, or .3333, depending upon the degree of accuracy required.

In other problems it is necessary to round off to the nearest required decimal place. This occurs when the digit is 5 or more, as occurs in converting 1/6 to a decimal (1/6 = .1666666 etc.) If you are told to round off to four decimal places, you would write the answer as 1/6 = .1667. Notice that since the fifth decimal place was 5 or more (6), the fourth place was raised by adding 1.

Converting Mixed Numbers To Decimals

When it is necessary to convert a mixed number to a decimal, only the fraction part is converted. The whole number is written with a decimal point and the decimal fraction to the right of the decimal as follows:

3 1/2 = 3.5 12 7/8 = 12.875 17 2/3 = 17.667 78 1/6 = 78.1667

Activity 16

Turn to Activity 16 on page 16 in the Working Papers and convert the mixed numbers to decimals.

STOP!

It is time for you to check your progress again. Do this by taking the progress test in Activity 17.

Activity 17

Turn to Activity 17 on page 17 in the Working Papers. Complete the self-test and then check your answers with those on page 33. If you do not get 80% (8 problems) or more correct, discuss those you missed with your teacher to find out if you need additional practice.

Rounding Off Decimals

Objective: Given 10 problems, round off decimals to one, two or three places as directed, with 90% accuracy.

Sometimes fewer decimal places are required than result in the answer from solution of a problem. This procedure is called rounding off. A figure with more decimal places than required is rewritten as needed and omitting the rest. If the answer is going to be as nearly correct as possible, the last figure must be raised one if the first figure dropped is 5 or more. If the first figure dropped is less than 5, no change is made. Study the examples below.

a. 3.65 = 3.7 – rounded to one place.
b. 8.7649 = 8.76 – rounded to two places.
c. 12.4736 = 12.474 – rounded to three places.
d. 18.73275 = 18.7328 – rounded to four places.

NOTE: When rounding off, consider only the first digit to be dropped. Look at "b" above. 8.7649 was rounded off to 8.76 because the first digit dropped was 4, which is less than 5. Do not make the mistake of rounding the 4 off to 5 because the next digit is 9. Remember, consider only the *FIRST* digit dropped.

Activity 18

Round off the decimals as directed in Activity 18 on page 18 of the Working Papers.

PER CENT

You will find per cent used often in business and in your daily life. Per cent is identified by the symbol %. It is always expressed as a fractional part of 100 or, in order words, in hundredths.

Changing Per Cents To Decimals

Objective: Given 10 problems, convert from percent to decimal and decimal to per cent with at least 90% accuracy.

Per cents may be converted to fractions or decimals. They are usually used as a decimal. Learning to convert per cents to fractions and decimals will help you to understand and use them. Study the examples shown below.

a. 25% = 25/100 or .25.
b. 2% = 2/100 or .02.
c. 68% = 68/100 or .68.
d. 5% = 5/100 or .05.
e. 98% = 98/100 or .98.
f. 100% = 100/100 or 1.00.

To change a per cent to a decimal, write the number, omitting the per cent sign, and move the decimal two places to the left. If there is no decimal point when a number is written as a per cent, the decimal point is understood to be after the last digit on the right. Therefore, per cents can be changed to decimals as shown below.

a. 45% = 45. or .45.
b. 8% = 08. or .08. Note it was necessary to prefix a 0 before the 8.
c. 63% = 63. or .63.

d. 2.5% = 02.5 or .025.
e. 100% = 1.00. or 1.00. Note 100% equals 1.
f. 350% = 3.50. or 3.50.

Whenever you use per cent in the solution of a problem, it must always be converted to a decimal.

Activity 19

Turn to page 19 in the Working Papers and try your hand at converting the per cents to decimals.

Changing Decimals To Per Cents

You have learned to convert per cents to decimals. You will also need to know how to convert decimals to per cents. This procedure is just the opposite of what you did to convert per cents to decimals. You converted per cents to decimals by moving the decimal two places to the left. To convert a decimal to a per cent, move the decimal two places to the right and add the per cent symbol. Study the examples below.

a. .35 = .35 or 35%.
b. 2.75 = 2.75 or 275%.
c. .075 = .07 5 or 7.5%.
d. .05 = .05 or 5%.
e. 1.25 = 1.25 or 125%.
f. .0225 = .02 25 or 2.25%.

Activity 20

Convert the decimals to per cents in Activity 20 on page 20 of the Working Papers.

Converting Fractions To Per Cents

Objective: Given 10 problems, convert fractions to per cents with at least 80% accuracy.

Sometimes it is necessary to change fractions to per cents. You can do this by converting the fraction to a decimal and then rewriting the decimal as a per cent. Divide denominator (bottom) into the numerator (top).

a. 18/25 = $25\overline{)18.00}$ = .72 or 72%

b. 1/4 = $4\overline{)1.00}$ = .25 or 25%

c. 3/8 = $8\overline{)3.000}$ = .375 or 37.5%

d. 2/3 = $3\overline{)2.00000}$ = .66666 or 66.67%

e. 2 3/4 = 2 + $4\overline{)3.00}$ = .75 = 2.75 or 275%

Activity 21

Turn to Activity 21 on page 21 in the Working Papers and convert the fractions to per cents.

Using Per Cents

It is often necessary to use per cents to find another number. For example, what is 25% of 160? Sometimes you also need to find what per cent one number is of another. For example, 24 people took the test and 21 passed. What per cent of those who took the test passed?

Objective: Given 10 problems, multiply and divide basic percentage problems with at least 80% accuracy.

Per cent is a way of expressing parts of a 100. In other words, 25% means 25 parts of every 100. If you say 25% of the people left a meeting early, you don't know how many left, but only that 25 of every hundred left. If you know how many people were at the meeting, you can find out how many left. For example: If there were 480 people at the meeting and 25% left early, how many left? Since you know that 25% tells how many left per hundred, you can call it a *rate*. That is the rate at which they left. You know there were 480 at the meeting. This is called the *base*. The number who left is called the *percentage*. Now you can apply a formula to find out how many left the meeting.

Percentage = Base x Rate

You can solve the problem as follows:

Base = 480
Rate = 25%
FIND: Percentage

Solution:
P = 480 x 25% or
P = 480 x .25
P = 120

$$\begin{array}{r} 480 \\ \times\ .25 \\ \hline 2400 \\ 960 \\ \hline 120.00 \end{array}$$

You can rearrange the formula given above in the same way to create a formula for finding either the base or the rate. For example:

B x R = P	Base x Rate = Percentage	25% x 480 = 120
P ÷ B = R	Percentage ÷ Base = Rate	120 ÷ 480 = .25 or 25%
P ÷ R = B	Percentage ÷ Rate = Base	120 ÷ .25 = 480

You will need to know how to apply these formulas in solving problems. On the following page you will find some examples. Work through these carefully to help you understand the use of per cents.

Example A: Assume you are earning $840 per month on a new job. You plan on making a budget based upon the following per cents: food, 25%; housing, 20%; clothing, 25%; miscellaneous, 30% and savings, 10%.

In this problem you are looking for what part of your earnings you will need to spend for food, housing, etc. The amounts you will spend are only fractional parts of your pay. Your pay then is the *base* and you are looking for the *percentage*. Apply the formula R x B = P to solve, as shown on the next page.

.25 x 840 = $210, the amount for food.
.20 x 840 = $168, the amount for housing.
.15 x 840 = $126, the amount for clothing.
.30 x 840 = $252, the amount for miscellaneous
.10 x 840 = $ 84, the amount for savings.

In many cases you will have to find the rate (per cent). Here is a rule that will help. If the product of two numbers is equal to a third number (3 x 4 = 12), then either number divided into the third number will give the other number. (12 ÷ 3 = 4) (12 ÷ 4 = 3). Thus, if you know two numbers, you can always find the third.

Example B: If you buy a house for $30,000 and make a down payment of $6,000, what is the per cent of the down payment?

In analyzing this problem, you will see that the $30,000 is the total cost of the house and, therefore, represents the *base*. The $6,000 or down payment represents the *percentage*. The missing item is the *per cent* (rate). Use the formula P ÷ B = R, and solve as shown below:

6,000 ÷ 30,000 = per cent

$$30{,}000\overline{)\,6{,}000.00} \quad .20 \text{ or } 20\%$$

60,000 ÷ 30,000 = .20 or 20%

Example C: If you are a salesman working on a commission of 15% of your sales and you receive a check for the past month for $1200, how much did you sell last month?

In this case we know the rate, which is 15%. We must decide whether the $1200 is the base or the percentage. The amount a salesman receives as commission is only a part of his sales. The $1200 represents 15% of his sales (base). To solve this problem use the formula P ÷ R = B.

1200 ÷ .15 = $8000

$$.15\overline{)\,1200.00} \quad 8000. \text{ or } \$8000$$
$$\underline{120}$$
$$0$$

Let's try another example and see how it works. Suppose Mr. Washington's take home pay is $1200 per month. The following per cents tell us what per cent of the $1200 he spent for each of the following things: food, 25%; housing, 20%; clothing, 15%; savings, 10%; and miscellaneous, 30%.

In order to find out how much money he spent for each of these things, we would proceed as follows:

1. Use the formula Percentage = Base x Rate.
2. The base is his pay or $1200.
3. The rates are the per cents spent for each item.
4. The percentage is the amount of money spent for each. For example:

Base x Rate = Percentage

$1200 x 25% = 1200 x .25 or $300 for food.
1200 x 20% = 1200 x .20 or $240 for housing.
1200 x 15% = 1200 x .15 or $180 for clothing.
1200 x 10% = 1200 x .10 or $120 for savings.
1200 x 30% = 1200 x .30 or $360 for miscellaneous

Now let's reverse the process. Suppose we know Mr. Washington takes home $1200 per month and spends the following amounts: food, $300; housing, $240; clothing, $180; savings, $120; and miscellaneous, $360. We know the amounts for the base and the percentages. We can use this information to find the rate.

Remember decimals represent fractions. Therefore we can express the amounts Mr. Washington spends for various things as a fraction of his take home pay. To illustrate, let's use the $300 he spends for food. If we place the $300 over his pay $1200, we have a fraction representing the part of his pay which is spent for food.

$$\frac{300}{1200} = \text{fraction of salary spent for food.}$$

Remember in the section on converting fractions to decimals this was done by dividing the numerator into the denominator. This is illustrated below using the amount Mr. Washington spends for food.

$$1200\overline{)300.00} \quad .25$$

2400
6000
6000

By moving the decimal two places to the right we can change the decimal into a per cent .25 = 25%. In other words, Mr. Washington spends 25% of his pay for food. The per cents for the other items may be found the same way.

In order to find the per cent (rate) we can use the formula below:

Percentage ÷ Base = Rate (per cent) or P ÷ B = R.

In order to find out what per cent he spent for each item, proceed as follows:

1. Use the formula P ÷ B = R.
2. The percentages are the dollar amounts spent for each item.
3. The base is $1200.
4. The rate is the per cent of his pay spent for each.

Percentage ÷ Base = Rate

$300 ÷ $1200 = 25% for food
240 ÷ 1200 = 20% for housing
180 ÷ 1200 = 15% for clothing
120 ÷ 1200 = 10% for savings
360 ÷ 1200 = 30% for miscellaneous.

It is also possible to find the *base* when only the percentage and rate is known. Let's use the same example to see how this works. in this case we know Mr. Washington divides his pay up as follows:

$300 or 25% for food
$240 or 20% for housing
$180 or 15% for clothing, etc.

In order to find out his take home pay (the base) we need to use another formula:

Percentage ÷ Rate = Base or P ÷ R = B.

a. If he spent $300 for food and this was 25% of his pay, you can find his pay as follows:

Percentage ÷ Rate = Base

$300 ÷ 25% = $1200

$$\begin{array}{r} \$1200. \\ .25\overline{)300.00} \\ \underline{25} \\ 50 \\ \underline{50} \end{array}$$

b. Since we are looking for the base, we can use any of the items and the answer will be the same. This is because the base is his pay, which is $1200. Using the $240 or 20% he spent for housing, the solution would look like this:

Percentage ÷ Rate = Base

$240 ÷ 20% = $1200

Remember the three formulas are written as follows:

B x R = P	Base x Rate = Percentage
P ÷ B = R	Percentage ÷ Base = Rate
P ÷ R = B	Percentage ÷ Rate = Base

As you do the problems in Activity 22, study each problem carefully to identify whether the two numbers given are the base, the rate or the percentage. Then apply the correct formula to solve the problem.

Activity 22

Turn to page 22 of the Activity Booklet and do each problem.

You have now completed all activities in the Math module. If you feel you need more practice on any part, see your teacher about additional practice material.

If you are ready for the post-test, obtain it from your teacher.

CCUBE MATH UNIT KEY

Activity 1:

(1) 1,369	(2) 1,881	(3) 2,062	(4) 2,397	(5) 1,267
(6) 12,129	(7) 13,368	(8) 4,127	(9) 8,460	(10) 5,033

Activity 2:

(1) 67	(2) 171	(3) 456	(4) 153	(5) 203
(6) 958	(7) 1,104	(8) 967	(9) 1,085	(10) 2,822

Activity 3:

(1) 1,736	(2) 10,321	(3) 8,667	(4) 8,500	(5) 10,108
(6) 245	(7) 1,036	(8) 1,287	(9) 228	(10) 1,279

Activity 4:

(1) 56,674	(2) 23,064	(3) 19,557	(4) 75,544
(5) 346,326	(6) 1,362,842	(7) 2,867,675	(8) 913,836
(9) 3,767,700	(10) 9,570,825		

Activity 5:

(1) 19	(2) 29	(3) 456	(4) 263	(5) 456	(6) 789 R19
(7) 1,564 R7	(8) 124 R57	(9) 257	(10) 1,357 R51		

Activity 6:

(1) 84,372	(2) 63,648	(3) 62,608	(4) 1,264,066	(5) 604,500
(6) 407	(7) 9,895 R5	(8) 43 R69	(9) 60 R9	(10) 37 R71

Activity 7:

(1) 3 13/40	(2) 1 11/32	(3) 1 8/9	(4) 2 19/20	(5) 17 1/16
(6) 33	(7) 15 29/36	(8) 30 1/4	(9) 16 3/8	(10) 18 1/6

Activity 8:

(1) 2/15	(2) 11/24	(3) 17 13/20	(4) 14 11/18	(5) 29 4/15
(6) 6 5/6	(7) 24 5/6	(8) 1/32	(9) 77 1/3	(10) 51/56

Activity 9:

(1) 35/48	(2) 7/30	(3) 3/7	(4) 21/128	(5) 16 7/8
(6) 82 1/2	(7) 13 5/16	(8) 2 1/4	(9) 123 29/32	(10) 8 9/14

Activity 10

(1) 1 1/2	(2) 2 2/5	(3) 14/15	(4) 1 8/25	(5) 9/16
(6) 6 2/3	(7) 3 5/7	(8) 1 5/24	(9) 108/175	(10) 1 13/76

Activity 11:

(1) 13/16	(2) 1 1/3	(3) 1/6	(4) 11/12	(5) 3/8
(6) 35/72	(7) 2 1/12	(8) 18/35	(9) 4	(10) 4 4/15

Activity 12:

(1) 206.56	(2) 120.825	(3) 130.435	(4) 178.55	(5) 185.63
(6) 1493.12	(7) 216.495	(8) 313.028	(9) 530.222	(10) 582.97

Activity 13:

(1) 17.782	(2) 456.22	(3) .862	(4) 16.87	(5) 786.51
(6) .4868	(7) 32.514	(8) 4.553	(9) 4.129	(10) 19.994

Activity 14:

(1) 56.588	(2) 1.951	(3) 17.487	(4) 75.00	(5) 9.346
(6) 136.746	(7) 25.165	(8) 193.27	(9) 20.283	(10) 2.896

Activity 15:

(1) 2895.833	(2) 1.840	(3) 2.385	(4) 2.57	(5) 27.152
(6) 46.214	(7) 7490.00	(8) 24.96	(9) 3800.00	(10) 7.263

Activity 16:

(1) 3.125	(2) 4.8333	(3) 7.5556	(4) 2.1875	(5) 6.4167
(6) 1.8571	(7) 5.1667	(8) 30.3	(9) 12.2857	(10) 24.3125

Activity 17:

(1) 92.979	(2) 213.96	(3) 9.891	(4) 710.892	(5) 6.487
(6) .363	(7) 58.232	(8) .431	(9) 56.357	(10) 43.857

Activity 18:

(1) 2.21	(2) 79.30	(3) 18.43	(4) 11.52	(5) 30.95
(6) 12.58	(7) 32.01	(8) 48.75	(9) 64.00	(10) 36.17

Activity 19:

(1) .50	(2) .08	(3) 1.25	(4) .0025	(5) .003
(6) .375	(7) 2.684	(8) .00007	(9) .9845	(10) 1.00

Activity 20:

(1) 250%	(2) .7%	(3) 3200%	(4) 66.67%	(5) 30%
(6) 45%	(7) 425%	(8) 107.5%	(9) 33%	(10) 8.25%

Activity 21:

(1) .5	(2) .6	(3) .33	(4) .65	(5) .53
(6) 5.86	(7) 12.67	(8) 23.56	(9) 6.87	(10) 12.84

Activity 22:

(1) Rent $255 Food $270 Savings $90

(2) $20,000 (3) 3060

(4) 15% (5) Office 25% Salespersons 15% Factory 60%

(6) $20

MATH

Teacher's Guide

This unit consists of three parts: the Student Manual, the Working Papers, and the pre- and post-tests. The unit is designed to provide a review of the basic mathematical functions required in business. If a student has severe deficiencies in math, it will be necessary to supplement this unit with additional practice material or place the student in a math class to develop basic math skills.

The unit is designed so that most students can work through it with only a minimum amount of direction from the teacher. The teacher, however, should monitor the student's progress in order to identify any areas where additional practice is needed.

Pre-test

The pre-test can be used as a diagnostic tool. It follows the format of the unit and provides a sample of all the basic functions involved. If a student demonstrates adequate skill in some areas, you may want to let him/her skip those and concentrate on those skills which are deficient.

Some of the activities are designed as self-tests to enable the students to evaluate their progress as they proceed through the unit. If a self-test indicates more practice is needed, the student should be given additional practice material before going on.

The answers to the problems in the activities are provided on the last four pages of the Student Manual. This is done in order to give students the opportunity for immediate feedback when they complete an activity. It should be pointed out to them at the beginning that copying the answers will only be self-defeating since they must satisfactorily pass the post-test before the unit is completed. However, if the teacher desires, these pages can be omitted from the Student Manual and made available in some other manner.

The Activity Pages, in most cases, have sufficient space for the students to do their calculations. They should be encouraged to use this space. This makes it easy to go back when an answer is wrong to see what was done that may have caused the error.

Post-test

Two post-tests are provided. When a student completes the unit and feels he/she is ready for a test, the first post-test should be used. If the score is unsatisfactory, the test should be analyzed and the student recycled through those areas where he/she had difficulty. It may be necessary, in some instances, to supplement this unit with other practice material. When both the teacher and student feel the student is ready, the second post-test may be given. If, for some reason, a third post-test is needed, the pre-test can be used again.

Teacher's Key

PRE-TEST
MATH COMPETENCY

Perform each of the functions as indicated. Write your answers in the spaces provided.

(1) 153 + 948 + 42 + 26 + 438 = 1607

(2) 2438 − 87 = 2351; 509 + 4208 + 211 = 4928; 2351 + 4928 = 7453

(3) 2882 − 683 = 2199

(4) 863 − 307 = 556

(5) 693 × 35 = 24255

(6) 769 × 297 = 228,393

(7) 24/672 = 28

(8) 56/16072 = 287

(9) $\frac{1}{2} + \frac{5}{8} + \frac{7}{16} + \frac{1}{4} = 1\frac{13}{16}$

(10) $\frac{7}{24} + \frac{5}{12} + \frac{3}{8} + \frac{5}{6} = 1\frac{11}{12}$

(11) $\frac{7}{8} - \frac{1}{6} = \frac{17}{24}$

(12) $14\frac{11}{27} - 9\frac{7}{9} = 4\frac{17}{27}$

(13) $\frac{7}{10} \times \frac{3}{16} = \frac{21}{160}$

(14) $12\frac{1}{4} \times 3\frac{5}{6} = 46\frac{23}{24}$

(15) $\frac{7}{12} \div \frac{4}{5} = \frac{35}{48}$

(16) $4\frac{2}{3} \div 2\frac{7}{8} = 1\frac{43}{69}$

(17) 28.34 + 2.005 + .99 + 8. + 82.4 = 121.735

(18) 46. + 14.865 + 9.7 + 15.04 + 72.006 = 157.611

(19) 83.42 − 24.53 = 58.89

(20) 1.401 − .589 = .812

Round off answer to 2 decimal places in problems 21 through 24.

(21) 35.2 × .38 = 13.38

(22) 7.431 × 3.08 = 22.89

(23) 2.4 / 17.58 = 7.33

(24) .003 / 9.66 = 3220.

Teacher's Key

Convert the following fractions to decimals rounded off to 3 decimal places.

(25) $5\frac{3}{8}$ = 5.375

(26) $12\frac{11}{13}$ = 12.846

Convert the following per cents to decimals.

(27) 175% = 1.75.

(28) .0375% = .000375

Convert the following decimals to per cents.

(29) .75 = 75%

(30) .0025 = .25%

Teacher's Key

POST-TEST
MATH COMPETENCY

Perform each of the functions as indicated. Write your answers in the spaces provided.

(1) 315 + 948 + 24 + 26 + 348 = 1661

(2) 2348 + 87 + 509 + 4028 + 211 = 7183

(3) 2782 − 684 = 2098

(4) 863 − 309 = 554

(5) 643 × 35 = 22,505

(6) 679 × 297 = 201,663

(7) 648 ÷ 24 = 27

(8) 16016 ÷ 56 = 286

(9) $\frac{1}{2} + \frac{3}{8} + \frac{9}{16} + \frac{3}{4} = 2\frac{3}{16}$

(10) $\frac{3}{4} + \frac{5}{12} + \frac{3}{8} + \frac{5}{6} = 2\frac{9}{24}$ or $2\frac{3}{8}$

(11) $\frac{7}{8} - \frac{1}{3} = \frac{13}{24}$

(12) $14\frac{11}{27} - 9\frac{5}{9} = 4\frac{23}{27}$

(13) $\frac{7}{9} \times \frac{3}{16} = \frac{21}{144}$

(14) $12\frac{1}{4} \times 3\frac{5}{6} = 46\frac{23}{24}$

(15) $\frac{7}{12} \div \frac{4}{5} = \frac{35}{48}$

(16) $4\frac{1}{3} \div 2\frac{7}{8} = 1\frac{35}{69}$

(17) 28.34 + .005 + 4.99 + 8. + 82.4 = 123.735

(18) 46. + 14.865 + 9.7 + 25.04 + 72.006 = 167.611

(19) 83.42 − 24.58 = 58.84

(20) 1.405 − .589 = .816

Teacher's Key

Round off answer to 2 decimal places in problems 21 through 24.

(21) $35.2 \times .38 = 13.38$

(22) $7.431 \times 3.08 = 22.89$

(23) $2.4/17.58 = 7.33$

(24) $.003/9.66 = 3220.$

Convert the following fractions to decimals rounded off to 3 decimals places.

(25) $5\frac{3}{8} = 5.375$

(26) $12\frac{11}{13} = 12.846$

Convert the following per cents to decimals.

(27) $125\% = 1.25$

(28) $.0375\% = .000375$

Convert the following decimals to per cents.

(29) $.65 = 65\%$

(30) $.00025 = .025\%$

Teacher's Key

POST-TEST No. 2
MATH COMPETENCY

Perform each of the functions as indicated. Write your answers in the spaces provided.

(1) 153 + 948 + 24 + 62 + 438 = 1625

(2) 2438 + 78 + 905 + 4208 + 211 = 7840

(3) 1982 − 683 = 1299

(4) 836 − 307 = 529

(5) 693 × 49 = 33,957

(6) 769 × 279 = 214,551

(7) 24/672 = 28

(8) 56/16072 = 287

(9) $\frac{1}{2} + \frac{5}{8} + \frac{7}{16} + \frac{1}{4} = 1\frac{13}{16}$

(10) $\frac{7}{24} + \frac{5}{12} + \frac{3}{8} + \frac{5}{6} = 1\frac{11}{12}$

(11) $\frac{7}{8} - \frac{1}{6} = \frac{17}{24}$

(12) $14\frac{11}{27} - 9\frac{7}{9} = 4\frac{17}{27}$

(13) $\frac{7}{10} \times \frac{3}{16} = \frac{21}{160}$

(14) $12\frac{1}{4} \times 3\frac{5}{6} = 46\frac{23}{24}$

(15) $\frac{7}{12} \div \frac{4}{5} = \frac{35}{48}$

(16) $4\frac{2}{3} \div 2\frac{7}{8} = 1\frac{43}{69}$

(17) 28.43 + 2.005 + .99 + 8. + 82.4 = 121.825

(18) 46. + 14.856 + 9.7 + 15.04 + 72.006 = 157.602

(19) 83.42 − 24.35 = 59.07

(20) 1.401 − .589 = .812

Round off answer to 2 decimal places in problems 21 through 24.

(21) 35.2 × .38 = 13.38

(22) 7.431 × 3.08 = 22.89

(23) 2.4/17.58 = 7.33

(24) .003/9.66 = 3220.

Teacher's Key

Convert the following fractions to decimals rounded off to 3 decimal places.

(25) $5\frac{3}{8}$ = 5.375

(26) $12\frac{11}{13}$ = 12.846

Convert the following per cents to decimals.

(27) 175% = 1.75

(28) .0375% = .000375

Convert the following decimals to per cents.

(29) .75 = 75%

(30) .0025 = .25%

ACTIVITY 1

Add each of the following problems and check your work. When you are finished, check your answers with those on page 28.

(1)	(2)	(3)	(4)	(5)
153	545	20	597	421
95	83	751	790	309
84	948	807	800	2
556	253	42	26	97
481	52	442	184	438
_____	_____	_____	_____	_____

(6)	(7)	(8)	(9)	(10)
4208	9483	344	89	688
751	211	2596	706	106
2050	752	509	4530	8
78	99	628	87	1793
5042	2843	50	3048	2438
_____	_____	_____	_____	_____

ACTIVITY 2

Do the indicated subtraction for each of the following problems. When finished, check your answers with those on page 28.

(1)	(2)	(3)	(4)	(5)
93	462	836	362	589
-26	-291	-380	-209	-386

(6)	(7)	(8)	(9)	(10)
2601	2086	8812	4634	3980
-1643	-982	-7845	-3549	-1158

ACTIVITY 3

This is a progress self-test. Do each of the problems by adding or subtracting as indicated. Prove each answer. Then check your answers against those on page 28. You should get at least 8 or more correct. If you don't, talk to your teacher about additional help.

(1)	(2)	(3)	(4)	(5)
153	688	438	1790	845
545	4208	628	807	2498
20	4983	2834	2483	1864
597	344	4052	2695	1397
421	98	715	725	3504
———	———	———	———	———

(6)	(7)	(8)	(9)	(10)
928	1881	2596	2711	3048
−683	−845	−1309	−2483	−1769
———	———	———	———	———

ACTIVITY 4

Find the product (answer) for each of the following multiplication problems. When you are finished, check your answers with those on page 28. If you are making errors and feel you need additional practice, see your teacher for more practice problems.

(1) 659 x 86 = _____

(2) 961 x 24 = _____

(3) 369 x 53 = _____

(4) 532 x 142 = _____

(5) 1758 x 197 = _____

(6) 1978 x 689 = _____

(7) 6275 x 457 = _____

(8) 2967 x 308 = _____

(9) 3966 x 950 = _____

(10) 3867 x 2475 = _____

Use the space below for calculations.

ACTIVITY 5

Find the quotient (answer) for each of the following division problems. When finished, check your answers with those on page 28. If you need more practice, ask your teacher for additional problems.

(1) $5\overline{)95}$ (2) $3\overline{)87}$ (3) $12\overline{)5472}$ (4) $24\overline{)6312}$

(5) $43\overline{)19608}$ (6) $34\overline{)26845}$ (7) $24\overline{)37543}$

(8) $78\overline{)9729}$ (9) $19\overline{)4883}$ (10) $65\overline{)88256}$

Use space below for calculations.

ACTIVITY 6

Solve each of the following problems as indicated. Check your answers with those on page 28.

(1) 948×89

(2) 208×306

(3) 728×86

(4) 4547×278

(5) $8060 - 75$

(6) $89\overline{)36223}$

(7) $6\overline{)59375}$

(8) $174\overline{)7551}$

(9) $144\overline{)8649}$

(10) $298\overline{)11097}$

Use the space below for calculation.

ACTIVITY 7

Find the sum for each group of fractions or mixed numbers. Reduce the fraction in your answer to its lowest terms. Check andswers on page 29.

(1) $\frac{7}{8} + \frac{4}{5} + \frac{3}{4} + \frac{9}{10} =$ _____ (2) $\frac{7}{16} + \frac{3}{8} + \frac{1}{4} + \frac{9}{32} =$ _____

(3) $\frac{5}{12} + \frac{2}{3} + \frac{5}{9} + \frac{1}{4} =$ _____ (4) $\frac{1}{2} + \frac{3}{4} + \frac{4}{5} + \frac{9}{10} =$ _____

(5)	(6)	(7)	(8)	(9)	(10)
$7\frac{5}{8}$	$13\frac{1}{6}$	$7\frac{3}{9}$	$24\frac{5}{6}$	$8\frac{3}{4}$	$3\frac{3}{4}$
$+9\frac{7}{16}$	$+19\frac{15}{18}$	$+8\frac{7}{12}$	$+5\frac{5}{12}$	$+7\frac{5}{8}$	$+14\frac{5}{12}$
_____	_____	_____	_____	_____	_____

Use the space below for calculations.

ACTIVITY 8

Find the difference for each problem below. Reduce all answers to their lowest terms. Check your answer with those on page 29.

(1) $\frac{1}{3} - \frac{1}{5}$

(2) $\frac{5}{6} - \frac{3}{8}$

(3) $30\frac{2}{5} - 12\frac{3}{4}$

(4) $26\frac{4}{9} - 11\frac{5}{6}$

(5) $47\frac{2}{3} - 18\frac{2}{5}$

(6) $15\frac{7}{18} - 8\frac{5}{9}$

(7) $52\frac{8}{15} - 27\frac{7}{10}$

(8) $\frac{29}{32} - \frac{7}{8}$

(9) $144 - 66\frac{2}{3}$

(10) $2\frac{5}{8} - 1\frac{5}{7}$

Use the space below for calculations.

ACTIVITY 9

Find the product in each of the following problems. Reduce all answers to their lowest terms. Check your answers with those on page 29.

(1) $\frac{5}{6} \times \frac{7}{8} =$ _____ (2) $\frac{7}{10} \times \frac{1}{3} =$ _____ (3) $\frac{3}{5} \times \frac{5}{7} =$ _____ (4) $\frac{7}{8} \times \frac{3}{16} =$ _____

(5) $4\frac{1}{2} \times 3\frac{3}{4} =$ _____ (6) $18\frac{1}{3} \times 4\frac{1}{2} =$ _____ (7) $4\frac{7}{16} \times 3 =$ _____

(8) $\frac{9}{10} \times 2\frac{1}{2} =$ _____ (9) $16\frac{1}{4} \times 7\frac{5}{8} =$ _____ (10) $2\frac{3}{4} \times 3\frac{1}{7} =$ _____

Use the space below for calculations.

ACTIVITY 10

Find the quotient for each of the following problems. When you are finished, check your answers with those on page 29.

(1) $\frac{1}{4} \div \frac{1}{6} =$ _____ (2) $\frac{4}{5} \div \frac{1}{3} =$ _____ (3) $\frac{7}{9} \div \frac{5}{6} =$ _____

(4) $\frac{11}{15} \div \frac{5}{9} =$ _____ (5) $\frac{3}{8} \div \frac{2}{3} =$ _____ (6) $5\frac{5}{6} \div \frac{7}{8} =$ _____

(7) $8\frac{2}{3} \div 2\frac{1}{3} =$ _____ (8) $7\frac{1}{4} \div 6 =$ _____ (9) $3\frac{3}{5} \div 5\frac{5}{6} =$ _____

(10) $9\frac{8}{9} \div 8\frac{4}{9} =$ _____

Use the space below for calculations.

ACTIVITY 11

This is a self-test to help you find out how well you are doing. Solve each of the problems. Then check your answers with those on page 29.

(1) $\frac{3}{16} + \frac{5}{8} =$ _____ (2) $\frac{7}{12} + \frac{3}{4} =$ _____ (3) $\frac{3}{4} - \frac{7}{12} =$ _____

(4) $1\frac{2}{3} - \frac{3}{4} =$ _____ (5) $\frac{3}{4} \times \frac{1}{2} =$ _____ (6) $\frac{5}{6} \times \frac{7}{12} =$ _____

(7) $2\frac{1}{2} \times \frac{5}{6} =$ _____ (8) $\frac{2}{5} \div \frac{7}{9} =$ _____ (9) $2\frac{1}{2} \div \frac{5}{8} =$ _____

(10) $5\frac{1}{3} \div 1\frac{1}{4} =$ _____

Use the space below for calculations.

ACTIVITY 12

Add each of the following problems. When you are finished, check your answers with those on page 29.

(1)
68.85
75.
28.43
34.28

(2)
17.93
87.375
7.52
8.

(3)
55.
64.81
2.005
8.62

(4)
83.21
11.75
.99
82.6

(5)
15.7
80.42
51.02
38.49

(6)
421.
30.92
297.4
743.80

(7)
18.465
55.
48.95
94.08

(8)
85.45
93.048
82.53
52.

(9)
86.8
49.38
344.
50.042

(10)
95.26
72.5
64.81
350.4

ACTIVITY 13

Subtract each of the following problems. When you are finished, check your answers by adding the remainder and subtrahend together. The total should equal the minuend. The correct answers are listed on page 29.

(1) 24.83
- 7.048

(2) 498.3
- 42.08

(3) 1.545
- .683

(4) 30.84
- 13.97

(5) 821.8
- 35.29

(6) .9803
- .4935

(7) 34.6
- 2.086

(8) 5.962
- 1.407

(9) 54.005
- 49.876

(10) 68.002
- 48.008

ACTIVITY 14

Find the product for each of the following multiplication problems. When you are finished, check your answers with those on page 30. If you are having trouble marking off the right number of decimal places, see your teacher for help. Round off answers correct to 3 decimal places.

(1) 6.58 × 8.6 = _____

(2) 2.35 × .83 = _____

(3) 52.99 × .33 = _____

(4) 25.00 × 3.00 = _____

(5) 34.11 × .274 = _____

(6) 96.3 × 1.42 = _____

(7) 7.19 × 3.5 = _____

(8) 62.75 × 3.08 = _____

(9) 42.7 × .475 = _____

(10) 1.734 × 1.67 = _____

Use the space below for calculations.

ACTIVITY 15

Find the quotient for each of the following division problems. When finished, check your answers with those on page 30. Round off answer to 3 decimal places.

(1) $6.95 \div .24 =$ _____

(2) $17.85 \div 9.7 =$ _____

(3) $57.24 \div 24 =$ _____

(4) $4.883 \div 1.9 =$ _____

(5) $6.245 \div .23 =$ _____

(6) $258.8 \div 5.6 =$ _____

(7) $37.45 \div .005 =$ _____

(8) $12.48 \div .5 =$ _____

(9) $95 \div .025 =$ _____

(10) $9.66 \div 1.33 =$ _____

Use the space below for calculations.

ACTIVITY 16

Convert the following mixed numbers to decimals. Check your answers with those on page 30. Show your answers correct to 4 decimal places.

(1) $3\frac{1}{8}$ = _____

(2) $4\frac{5}{6}$ = _____

(3) $7\frac{5}{9}$ = _____

(4) $2\frac{3}{16}$ = _____

(5) $6\frac{5}{12}$ = _____

(6) $1\frac{6}{7}$ = _____

(7) $5\frac{1}{6}$ = _____

(8) $30\frac{3}{10}$ = _____

(9) $12\frac{2}{7}$ = _____

(10) $24\frac{5}{16}$ = _____

Use the space below for calculations.

ACTIVITY 17

This is a progress self-test. Do each of the problems as indicated. Check your answers with those on page 30. You should get 8 or more correct. If you don't, see your teacher for instructions to help improve your skill. Round off multiplication and division problems to 3 decimal places.

(1) 7.74
9.09
36.049
40.1

(2) 49.061
38.19
68.
58.709

(3) 46,848
−36.957

(4) 792.9
82.908

(5) 5.108
× 1.27

(6) .1578
× 2.3

(7) 65.22 ÷ 1.12 = _____

(8) 3.619 ÷ 8.4 = _____

(9) $56\frac{5}{14}$ = _____

(10) $43\frac{6}{7}$ = _____

Use space below for calculations.

ACTIVITY 18

Round off the following decimals correctly to 2 decimal places. Check your answers with those on page 30.

(1) 2.206 = _____

(2) 79.2994 = _____

(3) 18.4341 = _____

(4) 11.5248 = _____

(5) 30.954 = _____

(6) 12.575 = _____

(7) 32.0095 = _____

(8) 48.7549 = _____

(9) 64.0045 = _____

(10) 36.1667 = _____

Use the space below for calculations.

ACTIVITY 19

Convert the following per cents to decimals. Check your answers with those on page 30.

(1) 50% = _____ (6) 37.5% = _____

(2) 8% = _____ (7) 268.4% = _____

(3) 125% = _____ (8) .007% = _____

(4) .25% = _____ (9) 98.45% = _____

(5) .3% = _____ (10) 100% = _____

ACTIVITY 20

Convert the following decimals to per cents. Check your answers with those on page 30.

(1) 2.5 = _____

(2) .007 = _____

(3) 32.0 = _____

(4) .6667 = _____

(5) .3 = _____

(6) .45 = _____

(7) 4.25 = _____

(8) 1.075 = _____

(9) .33 = _____

(10) .0825 = _____

ACTIVITY 21

Convert the following fractions to per cents. If the per cent contains a decimal, round off correctly to 2 decimal places. Answers are on page 31.

(1) $\frac{1}{2}$ = _____

(2) $\frac{3}{5}$ = _____

(3) $\frac{1}{3}$ = _____

(4) $\frac{15}{23}$ = _____

(5) $\frac{9}{17}$ = _____

(6) $5\frac{6}{7}$ = _____

(7) $12\frac{2}{3}$ = _____

(8) $23\frac{5}{9}$ = _____

(9) $6\frac{13}{15}$ = _____

(10) $12\frac{21}{25}$ = _____

Use the space below for calculations.

ACTIVITY 22

Find the base, rate or per cent for each of the following problems. Check your answers with those on page 31.

(1) A family earned $1,200 per month and spent the following: 17% for rent, 18% for food, 14% for taxes, 6% for medical costs, 7% for clothing, 15% for automobile payments and expenses, 9% for entertainment, and 8% for miscellaneous expenses. The remainder was put into savings.

How much did they pay for rent? Answer _____

How much did they pay for food? Answer _____

How much money did they save? Answer _____

(2) How much money must be invested at 5% in order to earn $1,000 per year?

Answer _____

(3) In a recent poll of a sample of 6,000 voters concerning two candidates for political office, 46% were found to favor candidate A. How many favored candidate B if 3% of those interviewed had no preference? Answer _____

(4) If a man earned $1,200 per month and decided to put $180 per month in savings, what per cent of his income did he save? Answer _____

(5) If a manufacturing business employs 500 people and 125 of these employees work in the office and 75 are sales persons, what per cent of the employees work in the office?

Answer _____

What per cent are sales persons? Answer _____

What per cent work in the factory? Answer _____

(6) John bought a tape recorder marked 20% off at a special sale. If he paid $16 for it, what was the regular selling price? NOTE: 20% is equal to the amount the price was reduced.

Answer _____

PRE-TEST
MATH COMPETENCY

Perform each of the functions as indicated. Write your answers in the spaces provided.

(1)
153
948
42
26
438
—

(2)
2438
87
509
4208
211
—

(3)
2882
- 683
—

(4)
863
-307
—

(5)
693
x35
—

(6)
769
x297
—

(7) ____
24/672

(8) ____
56/16072

(9) $\frac{1}{2} + \frac{5}{8} + \frac{7}{16} + \frac{1}{4} =$ ____

(10) $\frac{7}{24} + \frac{5}{12} + \frac{3}{8} + \frac{5}{6} =$ ____

(11)
$\frac{7}{8}$
$- \frac{1}{6}$
—

(12)
$14\frac{11}{27}$
$- 9\frac{7}{9}$
—

(13) $\frac{7}{10} \times \frac{3}{16} =$ ____

(14) $12\frac{1}{4} \times 3\frac{5}{6} =$ ____

(15) $\frac{7}{12} \div \frac{4}{5} =$ ____

(16) $4\frac{2}{3} \div 2\frac{7}{8} =$ ____

(17)
28.34
2.005
.99
8.
82.4
—

(18)
46.
14.865
9.7
15.04
72.006
—

(19)
83.42
-24.53
—

(20)
1.401
- .589
—

Round off answer to 2 decimal places in problems 21 through 24.

(21)
35.2
x.38
—

(22)
7.431
x3.08
—

(23) ____
2.4 /17.58

(24) ____
.003/9.66

Convert the following fractions to decimals rounded off to 3 decimal places.

(25) $5\frac{3}{8}$ = _____

(26) $12\frac{11}{13}$ = _____

Convert the following per cents to decimals.

(27) 175% = _____

(28) .0375% = _____

Convert the following decimals to per cents.

(29) .75 = _____%

(30) .0025 = _____%

POST-TEST
MATH COMPETENCY

Perform each of the functions as indicated. Write your answers in the spaces provided.

(1) 315 + 948 + 24 + 26 + 348 = _____

(2) 2348 + 87 + 509 + 4028 + 211 = _____

(3) 2782 − 684 = _____

(4) 863 − 309 = _____

(5) 643 × 35 = _____

(6) 679 × 297 = _____

(7) $24\overline{)648}$ = _____

(8) $56\overline{)16016}$ = _____

(9) $\frac{1}{2} + \frac{3}{8} + \frac{9}{16} + \frac{3}{4}$ = _____

(10) $\frac{3}{4} + \frac{5}{12} + \frac{3}{8} + \frac{5}{6}$ = _____

(11) $\frac{7}{8} - \frac{1}{3}$ = _____

(12) $14\frac{11}{27} - 9\frac{5}{9}$ = _____

(13) $\frac{7}{9} \times \frac{3}{16}$ = _____

(14) $12\frac{1}{4} \times 3\frac{5}{6}$ = _____

(15) $\frac{7}{12} \div \frac{4}{5}$ = _____

(16) $4\frac{1}{3} \div 2\frac{7}{8}$ = _____

(17) 28.34 + .005 + 4.99 + 8. + 82.4 = _____

(18) 46. + 14.865 + 9.7 + 25.04 + 72.006 = _____

(19) 83.42 − 24.58 = _____

(20) 1.405 − .589 = _____

Round off answer to 2 decimal places in problems 21 through 24.

(21) 35.2 × .38 = _____

(22) 7.431 × 3.08 = _____

(23) $2.4\overline{)17.58}$ = _____

(24) $.003\overline{)9.66}$ = _____

Convert the following fractions to decimals rounded off to 3 decimals places.

(25) $5\frac{3}{8}$ = _____

(26) $12\frac{11}{13}$ = _____

Convert the following per cents to decimals.

(27) 125% = _____

(28) .0375% = _____

Convert the following decimals to per cents.

(29) .65 = _____%

(30) .00025 = _____%

POST-TEST No. 2
MATH COMPETENCY

Perform each of the functions as indicated. Write your answers in the spaces provided.

(1) 153 + 948 + 24 + 62 + 438 = ____

(2) 2438 + 78 + 905 + 4208 + 211 = ____

(3) 1982 − 683 = ____

(4) 836 − 307 = ____

(5) 693 × 49 = ____

(6) 769 × 279 = ____

(7) 672 ÷ 24 = ____

(8) 16072 ÷ 56 = ____

(9) $\frac{1}{2} + \frac{5}{8} + \frac{7}{16} + \frac{1}{4}$ = ____

(10) $\frac{7}{24} + \frac{5}{12} + \frac{3}{8} + \frac{5}{6}$ = ____

(11) $\frac{7}{8} - \frac{1}{6}$ = ____

(12) $14\frac{11}{27} - 9\frac{7}{9}$ = ____

(13) $\frac{7}{10} \times \frac{3}{16}$ = ____

(14) $12\frac{1}{4} \times 3\frac{5}{6}$ = ____

(15) $\frac{7}{12} \div \frac{4}{5}$ = ____

(16) $4\frac{2}{3} \div 2\frac{7}{8}$ = ____

(17) 28.43 + 2.005 + .99 + 8. + 82.4 = ____

(18) 46. + 14.856 + 9.7 + 15.04 + 72.006 = ____

(19) 83.42 − 24.35 = ____

(20) 1.401 − .589 = ____

Round off answer to 2 decimal places in problems 21 through 24.

(21) 35.2 × .38 = ____

(22) 7.431 × 3.08 = ____

(23) 17.58 ÷ 2.4 = ____

(24) 9.66 ÷ .003 = ____

Convert the following fractions to decimals rounded off to 3 decimal places.

(25) $5\frac{3}{8}$ = _____

(26) $12\frac{11}{13}$ = _____

Convert the following per cents to decimals.

(27) 175% = _____

(28) .0375% = _____

Convert the following decimals to per cents.

(29) .75 = _____%

(30) .0025 = _____%