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ABSTRACT

This teacher guide is part of the materials prepared for an individualized program for ninth-grade algebra and basic mathematics students. Materials written for the program are to be used with audiovisual lessons recorded on tape cassettes. For an evaluation of the program, see ED 086 545. In this guide, the teacher is provided with objectives for each topic area and guided to materials written for a given topic. Three short criterion tests are included for each topic covered. Topics include averages, medians, squares, and square roots. This work was prepared under an ESEA Title III contract. (JP)

BASIC MATH I

Package #01-12

AVERAGES, MEDIANS, SQUARES, AND SQUARE ROOTS

Prepared By

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Averages, medians, squares and square roots, are more useful in Algebra and science than in out-of-school situations. There will be times when you may want to use them outside of school. You might want to know the average weight of the linemen on two opposing football teams, the average height of a basketball team, the average salary for mechanics, the average grade of all the students on a test, etc. You will want to know when it is better to use the median instead of the average.

Squares and square roots are useful in finding sides of triangles and can be used in special cases by surveyers, engineers, and navigators, but are not often used commonly. They will be useful in science and algebra classes.

The Goal of this package is:

To provide you with the understandings and skills necessary to solve the kinds of prpblems dealing with averages, medians, squares and square roots that you are likely to encounter in high school General Science and algebra I classes.

Package Objectives:

1. Given a problem involving an average or a median, solve it.
2. Given a number whose square root is a number of arithmetic, write its square root.
3. Given a number whose square root is not a number of arithmetic, find its approximate square root.

I. U. #01-12-01

AVERAGES AND MEDIANS

OBJECTIVES:

1. Given a set of numbers, find the average.

2. Given a set of numbers, find the median.

3. Given a problem involving an average or a median, solve it.

ACTIVITIES:

1. Study "Averages", pages 359 - 361, and do margin exercises 1 - 8. (Objective 1)

2. Study "Medians", pages 361, 362, and do margin exercises 9 - 14. (Objective 2)

3. Write the odd numbered Applied Problems, 7 - 14 on pages 367, 368. (Objective 3)

Criterion Test 01-12-01-01

1. Find the average

   (a) 15, 25, 31, 32, 33

   (b) 65, 75, 85, 80, 40

   (c) 81, 83, 82, 89, 0

2. Find the median.

   (a) 15, 25, 31, 32, 33

   (b) 65, 75, 85, 80, 40

   (c) 81, 83, 82, 89, 0

3. Solve.

   A student wants to get a B in English. He must average 85 or better on five tests. On the first four tests he made these scores: 80, 78, 85, 87. What is the lowest score he can get on the fifth test in order to receive an average of B?

Criterion Test 01-12-01-02

1. Find the average.

   (a) 45, 95, 55, 85, 65

   (b) 100, 100, 100, 100, 0

   (c) 65, 95, 115, 175, 212

2. Find the median.

   (a) 45, 95, 55, 85, 65

   (b) 100, 100, 0, 100, 100

   (c) 65, 95, 115, 175, 212

Continued on next page

Criterion Test 01-10-01-02 (Cont.)

3. The salaries of the employees of the Wanamaker Dress shop are:

Owner	19,500
Salesman	6,500
Secretary	4,500
Custodian	3,500

(a) What is the average salary?

(b) What is the median salary?

Criterion Test 01-12-01-03

1. Find the average:

(a) 13.4, 13.4, 12.6, 42.9

(b) 13, 13, 25, 27, 32

(c) 72, 83, 85, 88, 92

2. Find the median:

(a) 13.4, 13.4, 12.6, 42.9

(b) 13, 13, 25, 27, 32

(c) 72, 83, 85, 88, 92

3. If the Arnold backfield football players weigh 150, 160, 175, and 180, what is the average weight? What is the median weight?

Answers to Criterion Tests

Test 01-12-01-01

1. (a) $27\frac{1}{5}$ or 27.2 (b) 69 (c) 67

2. (a) 31 (b) 75 (c) 82

3. 95

Test 01-12-01-02

1. (a) 69 (b) 80 (c) $132\frac{2}{5}$ or 132.4

2. (a) 65 (b) 100 (c) 115

3. (a) \$8,500 (b) \$5,500

Test 01-12-01-03

1. (a) 20.575 (b) 22 (c) 84

2. (a) 13.4 (b) 25 (c) 85

3. (a) 166.25 pounds (b) 167.5 pounds

I. U. #01-12-02

SQUARES AND SQUARE ROOTS

OBJECTIVES:

1. Given a number of arithmetic, write its square.

2. Given a number whose square root is a number of arithmetic, write its square root.

ACTIVITIES:

1. Study "Squares" page 363 and do margin exercises 15 - 30. (Objective 1)

2. Study "Square roots" page 363 and 364 and do margin exercises 33 - 55. (Objective 2)

3. Exercise set 2 pages 369, 370 is related to these objectives. Do enough of the odd problems to be sure you have met the objectives.

Criterion Test 01-12-02-01

1. Write the square.

   (a) 12^2 (b) 15^2 (c) 9^2 (d) $(\frac{2}{5})^2$

2. Write the square root.

   (a) 25 (b) 81 (c) 144 (d) $\sqrt{\frac{50}{288}}$

Criterion Test 01-12-02-02

1. Find the square.

   (a) 25^2 (b) 14^2 (c) 17^2 (d) $(\frac{3}{4})^2$

2. Find the square root.

   (a) 36 (b) 169 (c) 225 (d) $\frac{32}{50}$

Criterion Test 01-12-02-03

1. Find the square.

   (a) 36^2 (b) 10^2 (c) 18^2 (d) $(\frac{5}{7})^2$

2. Find the square root.

   (a) 625 (b) 441 (c) 361 (d) $\frac{578}{722}$

Answers to Criterion Tests

Test 01-12-02-01

1. (a) 144 (b) 225 (c) 81 (d) $\frac{4}{25}$

2. (a) 5 (b) 9 (c) 12 (d) $\frac{5}{12}$

Test 01-12-02-02

1. (a) 625 (b) 196 (c) 289 (d) $\frac{9}{16}$

2. (a) 6 (b) 13 (c) 15 (d) $\frac{4}{5}$

Test 01-12-02-03

1. (a) 1296 (b) 100 (c) 324 (d) $\frac{25}{49}$

2. (a) 25 (b) 21 (c) 19 (d) $\frac{17}{19}$

I. U. #01-12-03

APPROXIMATING SQUARE ROOTS

OBJECTIVES:

1. Given a number whose square root is not a number of arithmetic, find its approximate square root.

ACTIVITIES:

1. Study pages 365 and 366 and do margin exercises 56 - 60. (Objective 1)

2. Exercise set 3 on pages 317 - 374 are practice exercises for objective 1. You will want to do enough of the odd numbered problems to be sure that you have met the objective.

Criterion Test 01-12-03-01

1. Find the square root to the nearest hundredth.

   (a) $\sqrt{5}$ (b) $\sqrt{6}$ (c) $\sqrt{7}$

Criterion Test 01-12-03-02

1. Find the square root to the nearest hundredth.

   (a) $\sqrt{8}$ (b) $\sqrt{10}$ (c) $\sqrt{11}$

Criterion Test 01-12-03-03

1. Find the square root to the nearest hundredth.

   (a) $\sqrt{34.7}$ (b) $\sqrt{12.5}$ (c) $\sqrt{12}$

Answers to Criterion Tests

Test 01-12-03-01

1. (a) 2.24 (b) 2.45 (c) 2.65

Test 01-12-03-02

1. (a) 2.83 (b) 3.16 (c) 3.32

Test 01-12-03-03

1. (a) 5.89 (b) 3.54 (c) 3.46

THE END

PACKAGE 01-12