

15.  $.64705 \rightarrow .6471$
14. 1.2
13.  $+\frac{6}{5}$
12. -56
11. 5.2
10.  $\frac{4}{9}$  or 2.25
9.  $7^3 = \frac{343}{1}$
8. -9
7.  $5.789 \rightarrow 5.79$
6. 4.2
5. 3.478
20. Greater
19. No
18. Yes
17. Yes
16. No
1.  $2\frac{8}{5}$
2. 10
3. 1.333
4. .2239

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# BASIC MATH

The Complete Course

Lesson Thirty

## Introduction to Algebra I KA8430

### Teaching Guide & Worksheet

#### HOW TO USE THE VIDEO AND TEACHING GUIDE

1. The "STOP TO THINK" signal means pause to think.
2. The "STOP TO WORK" signal means work the problem(s).
3. Rewind the tape and watch the lesson again if the concept is not clear.
4. Use "Learning Strategies" section of the Teachers Guide as memory aids and topics for classroom discussion.
5. Students should complete the exercises on the worksheet to confirm their understanding of this lesson.

Instructors may duplicate the worksheets as needed

# LEARNING STRATEGIES

## WHAT IS ALGEBRA?

- A. Algebra is a generalization of arithmetic
  - 1. Polynomials are similar to whole numbers
  - 2. The powers of the variable are the place values
  - 3. The coefficients are the digits
  - 4. The coefficients are not limited to the ten digits
  - 5. The rules for polynomials are the same as those for whole numbers
  - 6. The rules for algebraic fractions are the same as those for arithmetic fractions
  - 7. Since there are an infinite number of algebraic times tables, we need to be able to factor polynomials

## THE IMPORTANCE OF ALGEBRA

- A. Equations are used to solve problems
- B. Equations are used to provide models in order to determine relationships
- C. Solving systems of equations is used solve problems
- D. Algebra is used to generalize the structure of mathematics
- E. Failure to understand Algebra I limits a person's career options
- F. Failure to understand Algebra I minimizes a person's ability to deal with technology as a citizen and as a consumer
- G. Algebra I is the first floor but arithmetic is the foundation for mathematics and the sciences

## A REVIEW OF ARITHMETIC

- A. Adding and subtracting are counting, and you can only add or subtract within the same place value
- B. You always multiply digit times digit and place value times place value
- C. Division is the opposite of multiplication
- D. The long-division algorithm is a logical sequence of steps
- E. A fraction is a number with a digit and a place value
- F. The rules for adding, subtracting, and multiplying fractions are the same as for whole numbers
- G. The decimal point separates the whole-number place values from the fractional place values

## SOME THINGS THAT YOU SHOULD KNOW

- A. The rules for working with decimals
  - 1. To add or subtract, line up the decimal points
  - 2. To multiply, count the combined number of decimal places in the two numbers; this will be the number of decimal places in the answer
  - 3. To divide, change the problem to an equivalent division problem with a whole number divisor
- B. How to round off to a prescribed place value
  - 1. Divide to one place beyond the prescribed place
  - 2. If the digit in the last place of the answer is five or more, add one to the digit in the prescribed place
  - 3. If the digit in the last place of the answer is less than five, do not change the digit in the prescribed place
- C. The rules for the order of operations (PEMDAS)
  - 1. Complete operations in parentheses first
  - 2. Then complete all exponentiation
  - 3. Then multiply and divide
  - 4. Finally add and subtract
- D. Why the zero power of a number is one
  - 1. Using the rule of multiplication,  $8^3 \times 8^0 = 8^3$

- 2. Using the rule of division,  $8^3/8^3 = 8^0$
- E. In a fractional power, the numerator is the power and the denominator is the root
- F. A negative power calls for use of the reciprocal of the base
  - 1.  $2^{-1} = 1/2$
  - 2.  $(3/5)^{-2} = (5/3)^2$

# WORKSHEET STRATEGIES

## Solve the following:

- 1.  $5\frac{3}{8} - 2\frac{3}{4}$
- 2.  $8\frac{1}{3} \times 1\frac{1}{5}$
- 3.  $.47 + .863$
- 4.  $.5 - .2761$
- 5.  $3.7 \times .94$
- 6.  $\overline{.6}2\overline{5}2$
- 7.  $1.9\overline{)11}$  round to 100ths
- 8.  $-12 - 4x + 7 \div (-2 - -9) + -1$
- 9.  $7^3 \times 7^4 \div 7^5 \div 7^3 \times 7^0$
- 10.  $\left(\frac{8}{27}\right)^{\frac{2}{3}}$
- 11.  $7\frac{3}{5} - 2.4$
- 12.  $9\frac{1}{3} \times -6$
- 13.  $-2\frac{1}{2} - -3\frac{1}{3}$
- 14.  $(1.44)^{\frac{1}{2}}$
- 15.  $\frac{11}{17}$  change to a decimal rounded off to 10,000ths
- 16. Is  $\sqrt{9} + \sqrt{16} = \sqrt{25}$
- 17. Does  $3^2 + 4^2 = 5^2$ ?
- 18. Does  $3^2 + 4^2 = 12^2$ ?
- 19. Does  $3^2 + 4^2 = 7^2$ ?
- 20. Is  $\sqrt{\frac{1}{2}}$  greater or less than  $\frac{1}{2}$ ?