Name: _____ Date: _____

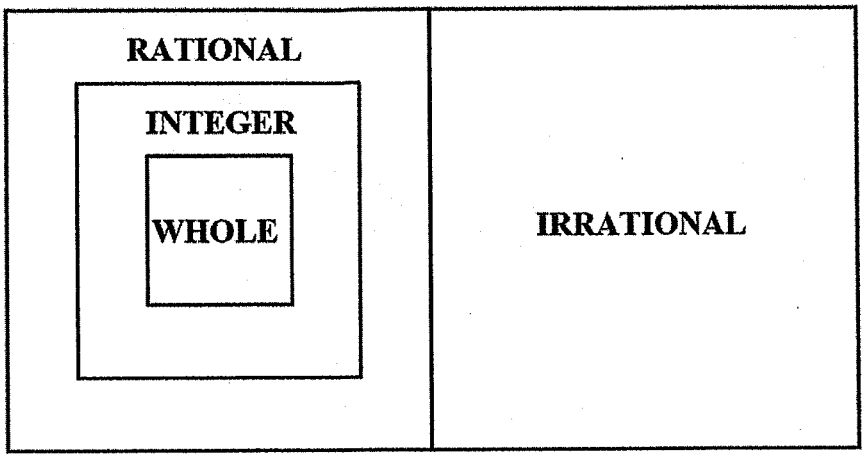
The Real Number System
Algebra 1

Algebra is a powerful tool to manipulate standard arithmetic to solve complex problems. At its heart are numbers. To begin our study of algebra, we must first review the **Real Number System,** a system that includes all of the types of numbers that we will work with throughout this course.

The Whole Numbers:

The Integers:

The Rational Numbers:



THE REAL NUMBERS

The Irrational Numbers:

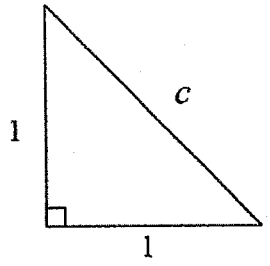
***Exercise* #1:** Which of the following is not an integer?

(1) $\frac{6}{3}$ (2) -17 (3) $\frac{3}{8}$ (4) 42

***Exercise* #2:** Which of the following is an irrational number?

(1) $\sqrt{25}$ (2) $-\frac{1}{2}$ (3) 0 (4) $\sqrt{10}$

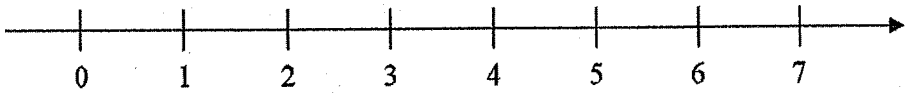
***Exercise* #3:** For the following isosceles right triangle, determine the length of its hypotenuse using the Pythagorean Theorem. What type of number is its length?



Oftentimes, it is important to compare rational and irrational numbers. Rational approximations are helpful in this case.

Exercise #4: Determine the value of each of the following variables to the nearest hundredth and then plot the variable on the number line below.

$w = \frac{\sqrt{79}}{3}$ $\quad x = \sqrt{3}$ $\quad y = \frac{29}{6}$ $\quad z = 2\pi$



Exercise #5: For each of the following pairs of numbers place a greater than symbol, >, or a less than symbol, <, to compare the two numbers.

(a) $\frac{133}{8} \square 5\pi$ $\quad$ (b) $-\sqrt{613} \square -\frac{6681}{250}$ $\quad$ (c) $\frac{\sqrt{43}}{7} \square \frac{\pi^2}{10}$

Exercise #6: Rational numbers are ratios of integers (or in other words, division of two integers). We can divide any two integers to get a rational number, except we cannot divide by the integer 0.

(a) Explain why $\frac{6}{3} = 2$ in terms of a multiplication sentence.

(b) Explain why $\frac{28}{4} = 7$ in terms of a multiplication sentence.

(c) Explain why $\frac{10}{0}$ does not exist as any real number considering your answers to (a) and (b).

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A.A.3: Expressions: Distinguish the difference between an algebraic expression and an algebraic equation

1 An example of an algebraic expression is
1) $\frac{2x+3}{7} = \frac{13}{x}$
2) $(2x+1)(x-7)$
3) $4x-1=4$
4) $x=2$

2 An example of an algebraic expression is
1) $x+2$
2) $y=x+2$
3) $y<x+2$
4) $y=x^2+2x$

3 An example of an algebraic expression is
1) $y=mx+b$
2) $3x+4y-7$
3) $2x+3y \leq 18$
4) $(x+y)(x-y)=25$

4 Mr. Stanton asked his students to write an algebraic expression on a piece of paper. He chose four students to go to the board and write their expression.

Robert wrote: $4(2x+5) \geq 17$
Meredith wrote: $3y-7+11z$
Steven wrote: $9w+2=20$
Cynthia wrote: $8+10-4=14$

Which student wrote an algebraic expression?
1) Robert
2) Meredith
3) Steven
4) Cynthia

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5 Chad complained to his friend that he had five equations to solve for homework. Are all of the homework problems equations? Justify your answer.

Math Homework

1. $3x^2 - 2x^4$
2. $5 - 2x = 3x$
3. $3(2x + 7)$
4. $7x^2 + 2x - 3x^2 - 9$
5. $\frac{2}{3} = \frac{x+2}{6}$

Name Chad