Alg 1 wk 1 Fri Warm-Up

1. Write an algebraic expression for the following:

a. 10 less that the product of 7 and g

b. two thirds of the volume of v

c. the product of y and 3

d. one third of the area a

e. Katie bakes 40 pastries (p) and makes coffee (c) for 200 people

f. the sum of a number and 14

g. 7 more than 11 times a number

2. Solve the following problems using the order of operations.

a. $16 - 8 \div 2^2 + 14$

b. $4 \div 2 + 5(10 - 6)$

c. $5 \cdot 4(10 - 8) + 20$

Types of Numbers

There are important sets of numbers you should know:

Types of Numbers

Natural numbers: the numbers that occur 'naturally' in the world. { 1, 2, 3, …}

Whole numbers: the natural numbers, and 0. { 0, 1, 2, 3,…}

Integers: positive and negative natural numbers, and 0. {…-3, -2, -1, 0, 1, 2, 3,…}

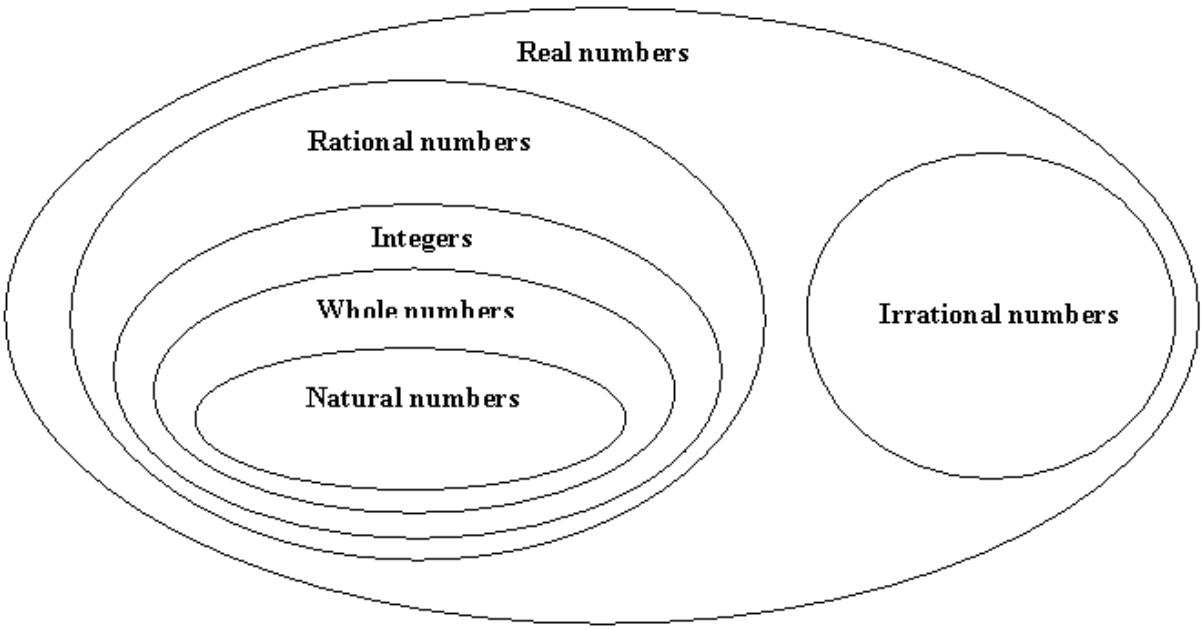
Rational numbers: any number that can be written as a ratio $\frac{a}{b}$ where a and b are integers, $b \neq 0$.

Examples: $\frac{2}{3}$; 7 because it equals $\frac{7}{1}$; 0 because it equals $\frac{0}{1}$; $0.33\overline{3}$ because it equals $\frac{1}{3}$; and 5.667 because it equals $\frac{5667}{1000}$.

Irrational numbers: any number that can not be written as a ratio $\frac{a}{b}$ where a and b are integers.

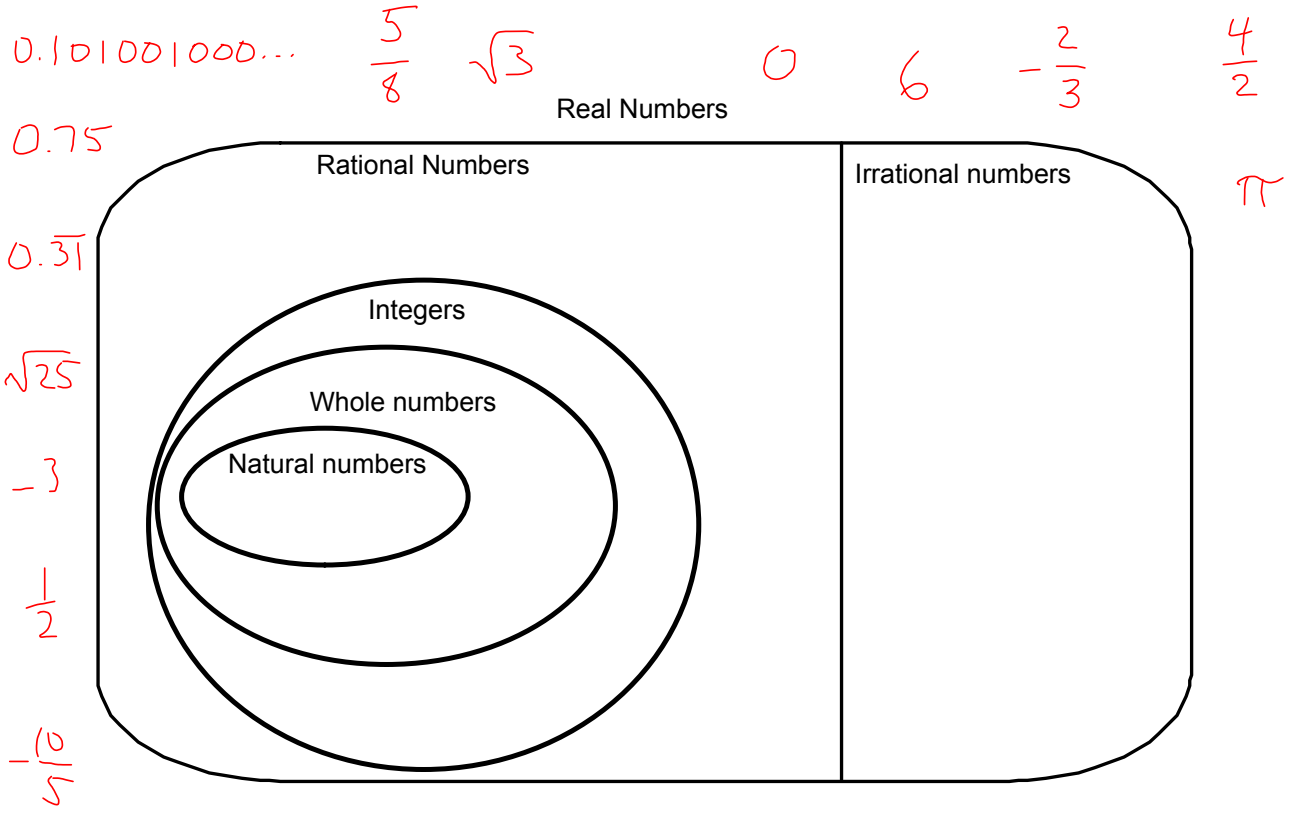
Examples: any non-repeating, non-terminating decimals; $\sqrt{2}$, π and the special number e.

All of these are examples of what we call **real numbers**. The diagram below shows the relationship between all these types of numbers.



Notice that $\frac{1}{0}$ does not fit any of these definitions. It is said to be an *undefined* expression.

Let's practice classifying numbers by dragging each handwritten number into the correct place in the chart below.



Use the information from the previous page to answer the questions below.

Name all of the sets of numbers to which each number belongs:

1. -1 2. 1/3 3. 7 4. 0

Which is the most reasonable for each situation, *whole numbers*, *integers*, or *rational numbers?*

5. Your shoe size.

6. The number of siblings you have

7. The number of quarts of paint you need to buy to paint a room.

8. The number of quarts of paint you use when you paint a room.

Is each statement *true* or *false*? If false, give a counterexample.

9. All integers are rational numbers.

10. All negative numbers are integers.

11. Every multiple of 3 is odd.

HW

It's all Greek to Me!

The Pythagorean Theorem was named after the Greek mathematician Pythagoras who was credited with its discovery. This theorem states a relationship between all three sides of a right triangle. All right triangles have two sides called **legs** (these form the right angle) and a longest side called the **hypotenuse** (across from the right angle).

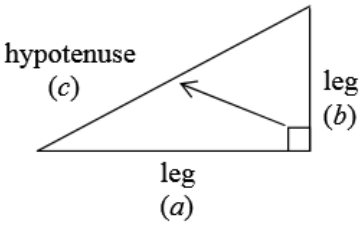
The Pythagorean Theorem

For right triangles only,

(leg)^2 + (leg)^2 = (hypotenuse)^2

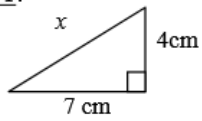
For the triangle shown to the right,

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



The following examples show how you can determine the length of one missing side if you are given two side lengths.

Example 1:



$\text{leg}^2 + \text{leg}^2 = \text{hypotenuse}^2$

$7^2 + 4^2 = x^2$

$49 + 16 = x^2$

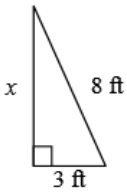
$65 = x^2$

$\sqrt{65} = x$

$8.1 \approx x$

The hypotenuse is about 8.1 cm long.

Example 2:



$\text{leg}^2 + \text{leg}^2 = \text{hypotenuse}^2$

$3^2 + x^2 = 8^2$

$9 + x^2 = 64$

$x^2 = 55$

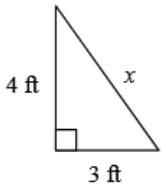
$x = \sqrt{55}$

$x \approx 7.4$

The missing leg is about 7.4 ft long.

Use the Pythagorean Theorem to find the length of the missing side in each of the following triangles. Show all of your steps and round your answers to the nearest tenth.

1.



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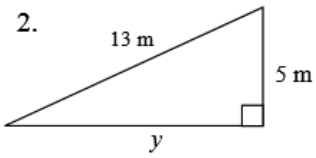
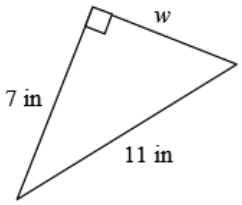
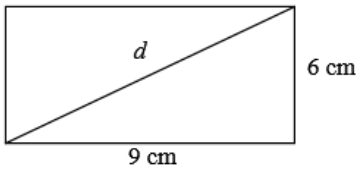


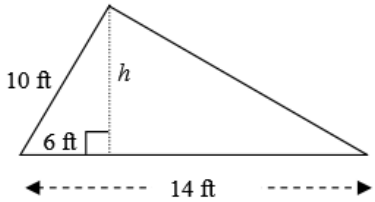
3.



4. Find the length of the diagonal of the rectangle shown.

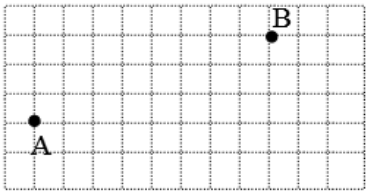


5. Find the height and area for the triangle shown.



6. Televisions are marketed by the length of the diagonal across the screen. If a 19" color TV has a length of 16", find its height.

7. What is the distance from A to B? (Hint: draw a right triangle.)



8. Use the Pythagorean Theorem to determine whether each set of numbers represents the sides of a right triangle.

a. 40, 96, 104

b. 12, 60, 61

Scrambled answers for #1-7: 5, ~8.5, ~8.5, ~10.2, ~10.8, 12, 56

HW p 20: 27-35 odd + 10-1.A and B

Name the subset(s) of the real numbers to which each number belongs. See Problem 3.

27. $\frac{2}{3}$ **29.** -1 **31.** π

33. $\frac{17}{4573}$ **35.** $\sqrt{113}$