

Let's work together. 

The Real Number System

1. Classify each number as rational or irrational. Justify your answer. Use the first example to help you.

Number	Rational or Irrational
0.9	<p>Rational</p> <ul style="list-style-type: none"> The number 0.9 can be written as a fraction in which the numerator and denominator are both integers. $0.9 = \frac{9}{10}$ The number 0.9 is a terminating decimal. All terminating decimals are rational.
-17	<p>Rational</p> <ul style="list-style-type: none"> -17 is an integer and can be written as a ratio of 2 integers. $(\frac{-17}{1})$
0	<p>Rational</p> <ul style="list-style-type: none"> 0 is a whole number and can be written as a ratio of 2 integers $(\frac{0}{1})$.
$-\frac{7}{8}$	<p>Rational</p> <ul style="list-style-type: none"> $-\frac{7}{8}$ is a ratio of 2 integers. $-\frac{7}{8} = -0.875$ which is a terminating decimal.
$5.\bar{6}$	<p>Rational</p> <ul style="list-style-type: none"> $5.\bar{6}$ is a repeating decimal. $5.\bar{6} = 5\frac{2}{3} \rightarrow$ a ratio of two integers
8.949949994...	<p>Irrational</p> <ul style="list-style-type: none"> it is a <u>non-terminating</u> <u>and</u> <u>non-repeating</u> decimal.

2. Amy says that the number $\frac{\sqrt{3}}{10}$ is rational because it's a fraction. Do you agree or disagree with Amy? Explain your reasoning.

Disagree because 3 is not a perfect square, it is irrational which causes the entire fraction to be irrational.

For #'s 3 – 5, tell whether the given statement is true or false. Explain why.

3. All whole numbers are rational numbers True or False
Explanation:

All whole numbers can be written as a ratio of 2 integers.

ex. $\frac{10}{1}$

4. All rational numbers are integers: True or False
Explanation:

Rational numbers include integers and non-integers such as fractions and decimals. ex. $\frac{3}{5}$

5. Some real numbers are irrational: True or False
Explanation:

Real numbers are either rational or irrational.

ex. $\frac{4}{5}$ is real and rational
 $\sqrt{5}$ is real and irrational

6. Which sequence of words best describes the set of numbers listed below?

$$\left\{ 6\frac{3}{5}, -97, 0.5\bar{1}, 31, \sqrt{12} \right\}$$

- ~~A.~~ rational, integer, irrational, natural, irrational
~~B.~~ rational, irrational, rational, whole, irrational
C. rational, integer, rational, natural, real
~~D.~~ real, integer, rational, natural, rational

Properties of Real Numbers

7. Write the letter of the property that is demonstrated by each numerical statement below.

- A. Commutative Property of Addition
 B. Commutative Property of Multiplication
 C. Associative Property of Addition
 D. Associative Property of Multiplication
 E. Distributive Property

- F. Identity Property of Addition
 G. Identity Property of Multiplication
 H. Inverse Property of Addition
 I. Inverse Property of Multiplication
 J. Zero Product Property

J $7 \times 0 = 0$

C $15 + (11 + 9) = (15 + 11) + 9$

I $\frac{7}{8} \times \frac{8}{7} = 1$

F $3\frac{1}{7} + 0 = \frac{22}{7}$

A $(8+4) \times 5 = (4+8) \times 5$

G $235 \times 1 = 235$

E $4(11 - 7) = 4(11) - 4(7)$

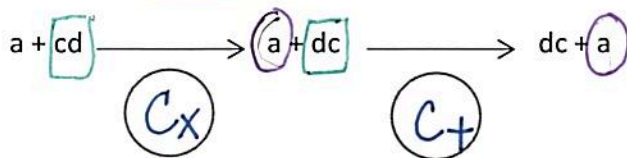
B $(1+7) \times (5+6) = (5+6) \times (1+7)$

H $28 + (-28) = 0$

8. Does the commutative property work under division? Justify your response with an example.

No because $10 \div 2 = 5$ and $2 \div 10 = 0.2$
 $5 \neq 0.2$

9. The following flow diagram shows that the expression $a + cd$ is equivalent to the expression $dc + a$.



Fill in each circle with the appropriate symbol below that demonstrates the property used.

C+ (for the "Commutative Property of Addition")

C× (for the "Commutative Property of Multiplication")

10. Frank says that the additive inverse of a number is always negative. Do you agree or disagree with this statement? Justify your response.

Disagree. The additive inverse is the opposite of a number. Opposites of negative numbers are positive. Opposites of positive numbers are negative.
 ex. $-20 \overset{\text{OPPOSITE}}{\updownarrow} 20$
 $5 \overset{\text{OPPOSITE}}{\updownarrow} -5$