The Real Number System Class Notes

Real Numbers

(Decimals that are non terminating and non repeating)

Irrational Numbers

$3\pi = 9.42477796\ldots$

$\pi = 3.1415\ldots$

$\sqrt{3} = 1.7320508\ldots$

(Can have fractions can have decimals)

Rational Numbers

.2 , .175 , $\frac{1}{2}$, $-\frac{1}{3}$

(Positive, Negative, Zero No decimals)

Integers

-4 0 8 -10

8 (Always Positive) 0

Whole Numbers

$\sqrt{16} = 4$

Class Notes

The Real Number System

- The set of **real numbers** consist of two subsets, rational and Irrational numbers
- **Irrational numbers** have decimal values that are non-terminating and non-repeating.
- Rational numbers can also be broken down into smaller categories. The first is integers. An **integer** is a positive or negative number that does not have a decimal, includes zero
- The other category of numbers is **whole numbers.** They are always positive and includes zero.

Use the terms listed above to help you complete the following questions. For each question, give a brief explanation of your answer.

1. Which of the following is not an integer?

   a. $\frac{6}{3} = 2$ b. -17 c. $\frac{3}{8} = .375$ d. 42

   Explanation: Integers never have decimals. $3/8 = .375$

2. Which of the following is an irrational number?

   a. $\sqrt{25} = 5$ b. $-\frac{1}{2} = -.5$ c. 0 d. $\sqrt{10} = 3.162...$

   Explanation: Irrational numbers are non-terminating and nonrepeating

   $\sqrt{10} = 3.162...$

3. Which of the following is not an integer?

   a. -13 b. $\frac{8}{2} = 4$ c. $\sqrt{36} = 6$ d. $\frac{13}{5} = 2.6$

   Explanation:

   An integer is a positive or negative number w/out a decimal.

   $\frac{13}{5} = 2.6$

   An integer does not have a decimal

4. Which of the following is a rational number? (positive, negative, terminating decimal, zero)

a. $\sqrt{5} = 2.236...$ b. $\frac{\pi}{2} = 1.57...$ c. $-\frac{3}{2} = -1.5$ d. $\sqrt{20} = 4.472...$

Explanation:

$\frac{-3}{2} = -1.5$ is a terminating decimal

5. Which of the following numbers is an integer but not a whole number? (Always positive)

a. -5 b. $\frac{12}{3} = 4$ c. $\pi = 3.14...$ d. 8

Explanation: Whole numbers must always be positive

6. Which of the following numbers is a rational number, but not an integer?

a. $\sqrt{12} = 3.464...$ b. $-\frac{3}{7} = -.428...$ c. $\frac{15}{3} = 5$ d. -6

Explanation:

Rational numbers can be decimals, integers can not