

WORKSHOP INDEX

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Real Number Properties

Objective

The following lesson will examine whole numbers, rational and irrational numbers, integers, and their properties.

What are the different types of numbers?

The **counting numbers** or natural numbers are the numbers 1,2,3,4,.... The **whole numbers** are the counting numbers plus zero. The **integers** are the whole numbers and all their opposites. Real numbers consist of rational and irrational numbers. Rational numbers include whole numbers, fractions, finite or repeating decimals, and percents. Irrational numbers are numbers that cannot be written as fractions since they are non-repeating and nonterminating decimals. A **fraction** is a ratio of two integers. The **real numbers** are the combination of the rational and irrational numbers. The only numbers that are not considered real numbers are the **complex** numbers which have the form $a + bi$.

A **prime number** is a number divisible only by 1 and itself. A **composite number** is a number with factors other than 1 and itself.

How do I convert between different forms of numbers?

We will study three conversions:

1. between fractions and decimals,
2. between fractions and percents, and
3. between percents and decimals.

First Conversion: Between fractions and decimals

To convert from fractions to decimals, divide the numerator by the denominator.

$$\frac{2}{5} = 2 \div 5 = 0.4$$

To convert from decimals to fractions, write the decimal as a fraction and reduce.

$$0.3 \text{ (read "three tenths")} = \frac{3}{10}$$

$$0.28 \text{ (read "28 hundredths")} = \frac{28}{100} = \frac{7}{25}$$

Second Conversion: Between fractions and percents

Think of a percent as meaning out of 100. To convert from fractions to percents, set the fraction equal to $\frac{x}{100}$ and solve for x .

$$\frac{2}{5} = \frac{x}{100}, 200 = 5x, x = 40, \text{ so } \frac{2}{5} = 40\%$$

To convert from percents to fractions, put the percent over 100 and reduce.

$$30\% = \frac{30}{100} = \frac{3}{10}$$

Third Conversion: Between percents and decimals

To convert from percents to decimals, move the decimal two places to the left and drop the percent sign. If no decimal place is shown assume the decimal place is at the right hand side of the number.

$$28\% = 0.28$$

To convert from decimals to percents, move the decimal two places to the right and add a percent sign.

$$0.3 = 30\%$$

Question

Which of the following correctly shows 125% converted to a fraction?

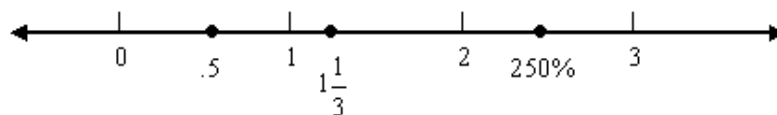
A. $\frac{125}{1000}$

- B. $\frac{5}{4}$
- C. $1\frac{2}{5}$
- D. $12\frac{1}{2}$

REVEAL ANSWER

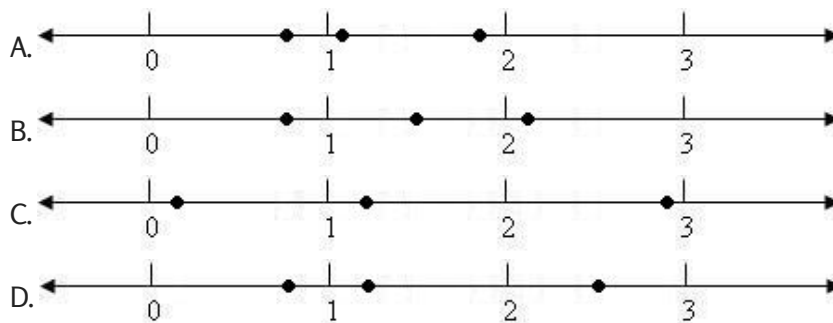
How are real numbers represented on a number line?

Real numbers, decimals, fractions, and percents can be thought of as a point on a number line, where they are placed according to their value. The points on a number line are called coordinates, while the zero point is called the origin. The line extends infinitely on both sides of the origin, with positive numbers to the right and negative numbers to the left.



Question

Which number line shows the correct placement of 1.25 , $\frac{3}{4}$, 250% ?



REVEAL ANSWER

How many numbers are between two real numbers?

Between every two real numbers, there are an infinite number of rational and irrational numbers.