

3.1 What is a Rational Number?

- Compare and order rational numbers

Any number that can be written as a fraction with an integer numerator and a non-zero integer denominator is a Rational Number. For example; $\frac{3}{4}$, $\frac{-3}{4}$, $\frac{3}{-4}$. Remember that the line in a fraction means divide.

Definition of a Rational Number:

- A rational number is any number that can be written in the form $\frac{m}{n}$, where m and n are integers and $n \neq 0$

Example #1 Writing a Rational Number between Two Given Numbers

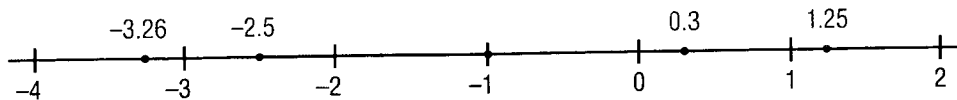
a) 1.25 and -3.26

b) $-\frac{1}{2}$ and $\frac{1}{4}$

There are many rational numbers between any two given numbers.
Sketch or visualize a number line in each case.

a) 1.25 and -3.26

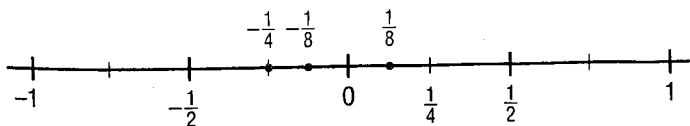
Label a number line with integers from -4 to 2.



$-\frac{1}{2}$ and $\frac{1}{4}$

Label a number line from -1 to 1.

Divide the line into quarters.



From the number line, 3 possible rational numbers are:

$-\frac{1}{4}$, $-\frac{1}{8}$, and $\frac{1}{8}$

Example #2 Ordering Rational Numbers in Decimal or Fraction Form

Use a number line. Order these numbers from least to greatest.

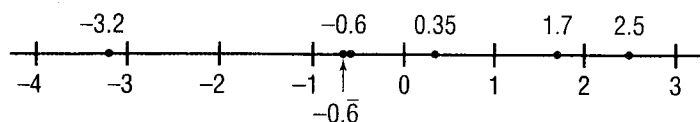
a) $0.35, 2.5, -0.6, 1.7, -3.2, -0.\bar{6}$

b) $-\frac{3}{8}, \frac{5}{9}, -\frac{10}{4}, -1\frac{1}{4}, \frac{7}{10}, \frac{8}{3}$

a) $0.35, 2.5, -0.6, 1.7, -3.2, -0.\bar{6}$

Mark each number on a number line.

$-0.\bar{6} = -0.666\ 666\dots$; so, $-0.\bar{6} < -0.6$



For least to greatest, read the numbers from left to right: $-3.2, -0.\bar{6}, -0.6, 0.35, 1.7, 2.5$

$-\frac{3}{8}, \frac{5}{9}, -\frac{10}{4}, -1\frac{1}{4}, \frac{7}{10}, \frac{8}{3}$

Write each number as a decimal.

Use a calculator when necessary.

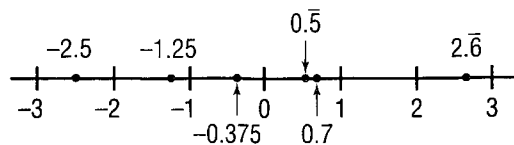
$-\frac{3}{8} = -0.375$ $\frac{5}{9} = 0.\bar{5}$

$-\frac{10}{4} = -2.5$ $-1\frac{1}{4} = -1.25$

$\frac{7}{10} = 0.7$ $\frac{8}{3} = 2.\bar{6}$

Mark each decimal on a number line.

Use the order of the decimals to order the fractions.



Example #3 Ordering Rational Numbers in Fraction and Decimal Form

Order these rational numbers from least to greatest

$$1.13, -\frac{10}{3}, -3.4, 2.\bar{7}, \frac{3}{7}, -2\frac{2}{5}$$

****It works best to turn all of the fractions into decimal numbers.**

$$1.13, -\frac{10}{3}, -3.4, 2.\bar{7}, \frac{3}{7}, -2\frac{2}{5}$$

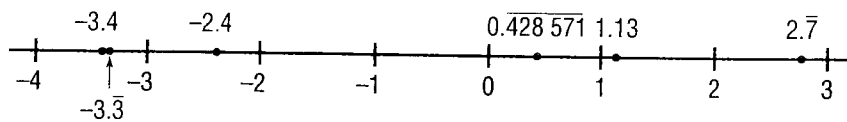
Write the fractions and mixed number as decimals.

$$-\frac{10}{3} = -3.\bar{3}$$

$$\frac{3}{7} = 0.\overline{428571}$$

$$-2\frac{2}{5} = -2.4$$

Mark each decimal on a number line.



For least to greatest, read the decimals from left to right.

The order is:

$$-3.4, -\frac{10}{3}, -2\frac{2}{5}, \frac{3}{7}, 1.13, 2.\bar{7}$$