

Lesson 3-10 Rational Numbers

Review: Compare the numbers below using $<$, $>$, or $=$.

$$\frac{8}{10} \stackrel{20}{\times} > \frac{3}{4} \stackrel{30}{\times}$$

$$\frac{12}{48} \stackrel{1}{\times} = 0.25 = \frac{1}{4}$$

$$1.3 = 1 \frac{3}{10}$$

Rational Number	<p>A number that can be written as a quotient of two integers, where the divisor is not 0.</p> <p>All whole numbers (positive and negative) are integers because they can be written as the number over 1, like this:</p> $8 = \frac{8}{1}$	$\frac{2}{5} \quad 0.25$ $-\frac{2}{3}$ $3\frac{1}{2} \quad 5$ -6
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A negative rational number can be written in 3 ways:

$$-\left(\frac{7}{9}\right) = \frac{-7}{9} = \frac{7}{-9}$$

Recall:

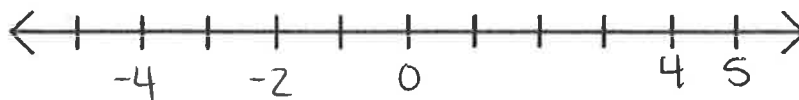
Compare the numbers below using $<$, $>$, or $=$.

$$-1 < 1$$

$$0 > -10$$

$$-5 > -8$$

Put these numbers in order from least to greatest on the number line below: -4, 5, -2, 4, 0



Comparing Negative Rational Numbers

Compare $-\frac{1}{2}$ and $-\frac{3}{4}$.

$$-\frac{1}{2} = \frac{-1}{2} \quad \leftarrow \text{Rewrite } -\frac{1}{2} \text{ with a } -1 \text{ in the numerator.}$$

$$= \frac{-1 \times 2}{2 \times 2} \quad \leftarrow \text{The LCD is 4. Write an equivalent fraction.}$$

$$= \frac{-2}{4} = -\frac{2}{4} \quad \leftarrow \text{The fraction } -\frac{2}{4} \text{ is equivalent to } -\frac{2}{4}.$$

Since $-\frac{3}{4} < -\frac{2}{4}$, then $-\frac{3}{4} < -\frac{1}{2}$.

Compare using $>$, $<$, or $=$.

$$-\frac{2}{3} < -\frac{1}{6}$$

$$\downarrow$$
$$-\frac{2}{3} \times 2 = \frac{-4}{6}$$

$$-\frac{1}{4} < -\frac{1}{8}$$

$$-\frac{2}{8} < -\frac{1}{8}$$

$$-\frac{2}{10} = -\frac{1}{5} > -\frac{3}{10}$$

Put these negative rational numbers in order from least to greatest: $-\frac{1}{6}$, $-\frac{2}{5}$, $-\frac{3}{10}$

$$-\frac{5}{30}, -\frac{12}{30}, -\frac{6}{30}$$

$$-\frac{2}{5}, -\frac{3}{10}, -\frac{1}{6}$$

Comparing Decimals

***First look at whether the numbers are positive or negative!

a. Compare 4.4 and 4.7.

$$4.4 < 4.7 \quad \leftarrow \text{Both numbers are positive. Compare the digits.}$$

b. Compare -4.4 and 4.7.

$$-4.4 < 4.7 \quad \leftarrow \text{Any negative number is less than a positive number.}$$

c. Compare -4.4 and -4.7.



\leftarrow Place the decimals on a number line and compare their locations.

You Try!

Compare -3.5 and 3.8. Use $<$, $>$, or $=$.

$$-3.5 < 3.8$$

Compare -4.2 and -4.9. Use $<$, $>$, or $=$.

$$-4.2 > -4.9$$

Compare -8.6 and -8.42. Use $<$, $>$, or $=$.

$$-8.6 < -8.42$$

Ordering Rational Numbers

Order these numbers from least to greatest: $\frac{1}{4}$, -0.2 , $-\frac{2}{9}$, 1.1

$$\frac{1}{4} = 1 \div 4 = 0.25 \quad \leftarrow \text{Write as a decimal.}$$

$$-\frac{2}{9} = -2 \div 9 = -0.22222... = -0.\bar{2} \quad \leftarrow \text{Write as a repeating decimal.}$$

$$-0.\bar{2} < -0.2 < 0.25 < 1.1 \quad \leftarrow \text{Compare the decimals.}$$

From least to greatest, the numbers are $-\frac{2}{9}$, -0.2 , $\frac{1}{4}$, and 1.1 .

$$\begin{array}{r} 9 \overline{) 2.00} \\ \underline{-18} \\ 20 \\ \underline{-18} \\ 2 \end{array}$$

$$\begin{array}{c} \downarrow \\ 0.\bar{2} \end{array} \quad \begin{array}{c} \downarrow \\ 0.25 \end{array}$$

$$\left(-\frac{2}{9}, -0.2, 0.25, 1.1\right) +$$

or $-0.\bar{2}$ or $\frac{1}{4}$

You Try!

Order from least to greatest.

13. $\frac{3}{2}, 0.25, -\frac{3}{4}, -1.0$

$\frac{1.5}{2} \frac{3.0}{2} = 1.5$
 0.25
 $-\frac{3}{4} = -0.75$
 -1.0

$-1.0, -\frac{3}{4}, 0.25, 1.5$

14. $2.\overline{33}, 2\frac{1}{3}, 2.4, -\frac{6}{25}, -1.34$

$2.\overline{33}$
or
 2.33

$-1.34, -\frac{6}{25}, 2\frac{1}{3}, 2.4$

15. $\frac{6}{11}, -1.5, 0.545, \frac{1}{2}$

$\frac{0.54}{11} \frac{6.000}{11} = 0.5454$

6.000
 -55
 50
 -44
 60
 -55
 50

$-1.5, \frac{1}{2}, 0.545, \frac{6}{11}$

16. $-0.8\overline{3}, -\frac{14}{15}, \frac{1}{12}, -0.953$

$\frac{14}{15} = 0.933$

$15 \overline{) 1400}$
 135
 50
 45
 50

$-0.953, -\frac{14}{15}, -0.8\overline{3}, \frac{1}{12}$