

Worksheets

Lesson 3.1 (all questions)

Lesson 3.2 (all questions)

Lesson 3.3 (all questions)

Lesson 3.4 (all questions)

Lesson 3.5 (all questions)

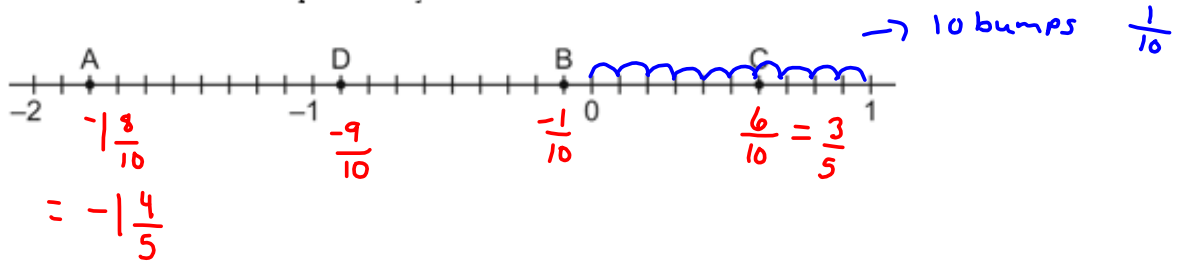
Lesson 3.6 (all questions)

Lesson 3.1: What Is a Rational Number?

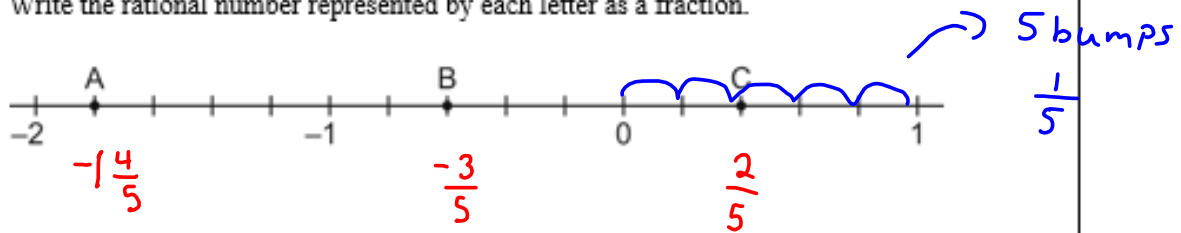
1. Which of the following numbers are equal to $-\frac{4}{5}$?

$\frac{4}{5}, -\frac{5}{4}, \boxed{-\frac{4}{5}}, -\frac{4}{-5}, \boxed{-\frac{8}{10}}$ _____

2. Write the rational number represented by each letter as a fraction



3. Write the rational number represented by each letter as a fraction.



4. Order the numbers from greatest to least. (Explain how you know)

$-2.25, \frac{5}{4}, -1.5, -\frac{1}{8}, 0.9$

\downarrow 1.25 \downarrow -0.125

greatest to least

$\frac{5}{4}, 0.9, -\frac{1}{8}, -1.5, -2.25$

5. In each pair, which rational number is greater? Explain how you know.

a) -7.30 -7.20
 ↑
 greater

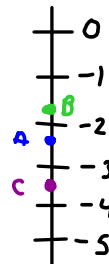
b) $\frac{4}{5}$, $\frac{5}{4}$ ↑ greater
 $\frac{16}{20}$, $\frac{25}{20}$

c) 1.2 -1.3
 greater

d) $-\frac{10}{13}$, $-\frac{10}{11}$
 $-\frac{110}{143}$, $-\frac{130}{143}$
 greater

6. Diver A is 2.3 m below sea level. blue
 Diver B is 1.7 m below sea level. green
 Diver C is 3.2 m below sea level. purple

a) Draw a vertical number line to show the location of the divers.



b) Which diver is farthest from the surface? Explain your thinking.

C, because she is farthest from Zero

Lesson 3.2: Adding Rational Numbers

1. Determine each sum.

$$\begin{aligned} \text{a) } & -\frac{3}{4} + \frac{1}{2} \\ & -\frac{3}{4} + \frac{2}{4} \\ & = -\frac{1}{4} \end{aligned}$$

$$\begin{aligned} \text{b) } & \frac{3}{4} + \frac{1}{2} \\ & \frac{3}{4} + \frac{2}{4} \\ & = \frac{5}{4} \end{aligned}$$

$$\begin{aligned} \text{c) } & \frac{3}{4} + \left(-\frac{1}{2}\right) \\ & = \frac{3}{4} + \frac{-2}{4} \\ & = \frac{1}{4} \end{aligned}$$

$$\begin{aligned} \text{d) } & -\frac{3}{4} + \left(-\frac{1}{2}\right) \\ & = \frac{-3}{4} + \frac{-2}{4} \\ & = \frac{-5}{4} \end{aligned}$$

3. Sarah borrowed \$40.25 from her parents for a new sweater. She earns \$17.50 for a night of baby-sitting and gives this to her parents.

a) Write an addition statement to represent this situation. $-40.25 + 17.50$

b) How much does Sarah now owe? $= -22.75$

4. Determine each sum.

$$\begin{aligned} \text{a) } & 2\frac{2}{5} + \left(-4\frac{1}{2}\right) \\ & = \frac{12}{5} + \left(\frac{-9}{2}\right) \\ & = \frac{24}{10} + \frac{-45}{10} \\ & = \frac{-21}{10} \\ & = -2\frac{1}{10} \end{aligned}$$

$$\begin{aligned} \text{b) } & -6\frac{3}{8} + \left(-1\frac{1}{5}\right) \\ & = \frac{-51}{8} + \frac{-6}{5} \\ & = \frac{-255}{40} + \frac{-48}{40} \\ & = \frac{-303}{40} \\ & = -7\frac{23}{40} \end{aligned}$$

5. Determine each sum.

a) $-3.6 + (-21.9)$

$$= -25.5$$

b) $-0.81 + 2.4$

$$= 1.59$$

c) $9.78 + (-13.33)$

$$= -3.55$$

d) $4.88 + (-12.26)$

$$= -7.38$$

Lesson 3.3: Subtracting Rational Numbers

1. Determine each difference.

$$\begin{aligned} \text{a) } & -\frac{3}{4} - \frac{1}{2} \\ & = -\frac{3}{4} - \frac{2}{4} \\ & = -\frac{5}{4} \end{aligned}$$

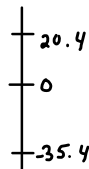
$$\begin{aligned} \text{b) } & 3\frac{3}{5} - \left(-5\frac{1}{2}\right) \\ & = \frac{18}{5} - \left(-\frac{11}{2}\right) \\ & = \frac{36}{10} - \left(-\frac{55}{10}\right) \\ & = \frac{91}{10} \\ & = 9\frac{1}{10} \end{aligned}$$

$$\begin{aligned} \text{c) } & 3\frac{2}{7} - 4\frac{3}{5} \\ & = \frac{23}{7} - \frac{23}{5} \\ & = \frac{115}{35} - \frac{161}{35} \\ & = -\frac{46}{35} \\ & = -1\frac{11}{35} \end{aligned}$$

$$\begin{aligned} \text{d) } & 3\frac{1}{4} - \left(-2\frac{2}{3}\right) \\ & = \frac{13}{4} - \left(-\frac{8}{3}\right) \\ & = \frac{39}{12} + \frac{32}{12} \\ & = \frac{71}{12} \\ & = 5\frac{11}{12} \end{aligned}$$

2. Two climbers leave base camp at the same time. Climber A ascends 20.4 m, while climber B descends 35.4 m. How far apart are the climbers? Write a subtraction statement using rational numbers to solve the problem.

$$\begin{aligned} & 20.4 - (-35.4) \\ & = 55.8 \end{aligned}$$



3. Determine each difference.

$$\begin{aligned} \text{a) } & -4.7 - 5.9 \\ & = -10.6 \end{aligned}$$

$$\begin{aligned} \text{b) } & 0.94 - 1.35 \\ & = -0.41 \end{aligned}$$

$$\begin{aligned} \text{c) } & -43.91 - (-9.44) \\ & = -34.47 \end{aligned}$$

6. Determine the missing rational number in each addition statement.

$$\text{a) } -\frac{2}{3} - \square = 3\frac{5}{6}$$

$$\begin{aligned} -\frac{4}{6} - \square & = \frac{23}{6} \\ \downarrow & \\ -\frac{27}{6} & \end{aligned}$$

$$\text{b) } \square - \left(-\frac{3}{4}\right) = -2\frac{1}{2}$$

$$\begin{aligned} \square - \left(-\frac{3}{4}\right) & = -\frac{5}{2} \\ \square + \frac{3}{4} & = -\frac{10}{4} \\ \downarrow & \\ -\frac{13}{4} & \end{aligned}$$

Lesson 3.4: Multiplying Rational Numbers

1. Determine each product.

$$\begin{array}{llll} \text{a) } (-1.2) \times 0.3 & \text{b) } 0.34 \times (-0.5) & \text{c) } (-0.6) \times (-0.15) & \text{d) } 0.9 \times (-1.2) \\ = -0.36 & = -0.17 & = 0.09 & = -1.08 \end{array}$$

$$\begin{array}{ll} \text{e) } (1.19)(-13.2) & \text{f) } (-8.65)(-1.6) \\ = -15.708 & = 13.84 \end{array}$$

2. Determine each product.

$$\begin{array}{lll} \text{a) } \frac{2}{5} \times \left(-\frac{1}{2}\right) & \text{b) } \left(-\frac{3}{2}\right) \times \left(\frac{1}{7}\right) & \text{c) } \left(-\frac{3}{4}\right) \times \left(-\frac{1}{5}\right) \\ \frac{1}{5} \times \frac{-1}{1} & = -\frac{3}{14} & = \frac{-3}{1} \times \frac{-1}{5} \\ = -\frac{1}{5} & & = \frac{3}{5} \end{array}$$

$$\begin{array}{ll} \text{c) } \left(\frac{5}{7}\right) \times \left(-\frac{13}{8}\right) & \text{d) } \left(-4\frac{3}{5}\right) \times \left(-2\frac{5}{12}\right) \\ \frac{5}{7} \times \frac{-13}{4} & \frac{-23}{5} \times \frac{-29}{12} \\ = -\frac{65}{28} & = \frac{667}{60} \\ & = 11\frac{7}{60} \end{array}$$

3. From November 12th to November 21st, the temperature in Burnaby, B.C. dropped an average of 1.7°C each day. Suppose the temperature on the morning of November 12th was 11.4°C . What was the temperature on the morning of November 21st?

$$9 \times 1.7 = 15.3$$

$$11.3 - 15.3$$

$$= -4$$

Lesson 3.5: Dividing Rational Numbers

1. Determine each quotient.

$$\begin{array}{llll} \text{a)} & (-1.6) \div 0.2 & \text{b)} & (-0.6) \div (-3) & \text{c)} & 16.4 \div (-5.5) & \text{d)} & (-0.98) \div 12.4 \\ & = -8 & & = 0.2 & & = -2.98 & & = 0.079 \end{array}$$

2. Calculate each quotient.

$$\begin{array}{llll} \text{a)} & \frac{1}{5} \div \left(-\frac{2}{5}\right) & \text{b)} & \left(-\frac{2}{3}\right) \div \left(\frac{5}{6}\right) & \text{c)} & \left(-\frac{3}{4}\right) \div \left(-\frac{5}{2}\right) & \text{d)} & \frac{5}{9} \div \left(-\frac{2}{3}\right) \\ & \frac{1}{5} \times \frac{\cancel{5}}{2} & & \frac{-2}{3} \times \frac{\cancel{6}}{5} & & \frac{-3}{\cancel{4}} \times \frac{\cancel{2}}{5} & & \frac{5}{\cancel{9}} \times \frac{\cancel{3}}{2} \\ & \frac{1}{1} \times \frac{-1}{2} & & \frac{-2}{1} \times \frac{2}{5} & & \frac{-3}{2} \times \frac{1}{5} & & = \frac{5}{3} \times \frac{-1}{2} \\ & = \frac{-1}{2} & & = \frac{-4}{5} & & = \frac{3}{10} & & = \frac{-5}{6} \end{array}$$

$$\begin{array}{ll} \text{c)} & 3\frac{1}{2} \div \left(-2\frac{1}{6}\right) & \text{d)} & \left(-2\frac{1}{5}\right) \div \left(-4\frac{3}{4}\right) \\ & \frac{7}{2} \div \frac{-13}{6} & & \frac{-11}{5} \div \frac{-19}{4} \\ & \frac{7}{2} \times \frac{\cancel{6}}{13} & & \frac{-11}{5} \times \frac{-4}{19} \\ & \frac{7}{1} \times \frac{-3}{13} & & = \frac{-44}{95} \\ & = \frac{-21}{13} & & \\ & = -1\frac{8}{13} & & \end{array}$$

3. A diver descends 3.2 m in 5 min. What was his average rate of descent in metres per minute?

$$\frac{3.2 \text{ m}}{5 \text{ min}} = 0.6 \text{ m/min}$$

6. Replace each \square with a rational number to make each equation true.

$$\begin{array}{l} \text{a)} \quad \square \times 2.5 = -1.6 \\ \square = -1.6 \div 2.5 \\ \square = -0.64 \end{array}$$

$$\begin{array}{l} \text{b)} \quad (-5.7) \div \square = 1.5 \\ \square = -5.7 \div 1.5 \\ \square = -3.8 \end{array}$$

Lesson 3.6: Order of Operations with Rational Numbers

1. Evaluate.

a) $4.5 + 5.1 \div 1.7$

$4.5 + 3$

$= 7.5$

b) $-5.8 - 3.1 \times 0.5$

$-5.8 - 1.55$

$= -7.35$

c) $\frac{2}{3} \times \left(-\frac{1}{2}\right) + \frac{5}{6}$

$\frac{1}{3} \times \frac{-1}{1}$

$-\frac{1}{3} + \frac{5}{6}$

$-\frac{2}{6} + \frac{5}{6}$

$= \frac{3}{6}$

$= \frac{1}{2}$

d) $\frac{3}{8} - \frac{9}{4} \div \left[\left(-\frac{5}{4}\right) + \left(-\frac{1}{10}\right) \right]$

$\left[\frac{-25}{20} + \frac{-2}{20} \right]$

$\frac{3}{8} - \frac{9}{4} \div \left[\frac{-27}{20} \right]$

$\frac{3}{8} - \frac{9}{4} \times \frac{-20}{27}$

$\frac{3}{8} - \frac{1}{1} \times \frac{-5}{3}$

$\frac{3}{8} - \frac{-5}{3}$

$\frac{3}{8} + \frac{5}{3}$

$\frac{9}{24} + \frac{40}{24}$

$= \frac{49}{24} = 2 \frac{1}{24}$

e) $-4\frac{2}{3} \div \left[\left(-\frac{1}{3}\right) + 4\frac{1}{6} \right] + \left(-3\frac{2}{5}\right)$

f) $1\frac{5}{9} - \left(-2\frac{1}{6}\right) + \left[4\frac{1}{4} + \left(-3\frac{1}{2}\right) \right]^2 \div \frac{2}{5}$

$$e) -4\frac{2}{3} \div \left[\left(-\frac{1}{3} \right) + 4\frac{1}{6} \right] + \left(-3\frac{2}{5} \right)$$

$$\frac{-14}{3} \div \left[\frac{-1}{3} + \frac{25}{6} \right] + \left(\frac{-17}{5} \right)$$

$$\frac{-2}{6} + \frac{25}{6}$$

$$\frac{-14}{3} \div \frac{23}{6} + \frac{-17}{5}$$

$$\frac{-14}{3} \times \frac{6}{23} + \frac{-17}{5}$$

$$\frac{-14}{1} \times \frac{2}{23} + \frac{-17}{5}$$

$$\frac{-28}{23} + \frac{-17}{5}$$

$$\frac{-140}{115} + \frac{-391}{115}$$

$$= \frac{-531}{115}$$

$$= -4\frac{31}{115}$$

$$f) 1\frac{5}{9} - \left(-2\frac{1}{6} \right) + \left[4\frac{1}{4} + \left(-3\frac{1}{2} \right) \right]^2 \div \frac{2}{5}$$

$$= \frac{14}{9} - \left(\frac{-13}{6} \right) + \left[\frac{17}{4} + \frac{-7}{2} \right]^2 \div \frac{2}{5}$$

$$\frac{17}{4} + \frac{-14}{4}$$

$$= \frac{14}{9} - \left(\frac{-13}{6} \right) + \left[\frac{3}{4} \right]^2 \div \frac{2}{5}$$

$$= \frac{14}{9} - \left(\frac{-13}{6} \right) + \frac{9}{16} \div \frac{2}{5}$$

$$= \frac{9}{16} \times \frac{5}{2}$$

$$= \frac{14}{9} - \left(\frac{-13}{6} \right) + \frac{45}{32}$$

$$= \frac{28}{18} - \frac{-39}{18} + \frac{45}{32}$$

$$\frac{67}{18} + \frac{45}{32}$$

$$\frac{1072}{288} + \frac{405}{288}$$

$$= \frac{1477}{288}$$

$$= 5\frac{37}{288}$$

3. A formula for the area of a trapezoid is $A = a \left(\frac{b+c}{2} \right)$ where b and c are the lengths of the parallel sides and a is the perpendicular distance between these sides. Use the formula to determine the area of a trapezoid with: $a = 3.5$ cm, $b = 5.7$ cm, $c = 8.1$ cm.

$$A = 3.5 \left(\frac{5.7 + 8.1}{2} \right)$$

$$A = 3.5 \left(\frac{13.8}{2} \right)$$

$$A = 3.5 (6.9)$$

$$A = 24.15$$

4. Evaluate this expression. Round the answer to the nearest hundredth.

$$\frac{9.6 \times 12.6 - 5.1 \div (-7.4) - 0.6}{(-2.9) \div 1.3 - (-6.5)}$$

$$(-2.9) \div 1.3 - (-6.5)$$

Top

$$9.6 \times 12.6 - 5.1 \div (-7.4) - 0.6$$

$$= 120.96 - (-0.69) - 0.6$$

$$= 121.05$$

Bottom:

$$= (-2.9) \div 1.3 - (-6.5)$$

$$= -2.23 + 6.5$$

$$= 4.23$$

$$\frac{\text{Top}}{\text{Bottom}} = \frac{121.05}{4.23} = 28.6$$