

## 2.2 Problem Solving With Rational Numbers in Decimal Form

*MathLinks 9, pages 55-62*

### Key Ideas Review

Circle the correct response to complete each statement.

- One way to model the subtraction of rational numbers is by (adding/subtracting) the opposite on a number line.
- The product or quotient of two rational numbers with different signs is (positive/negative).
- The product or quotient of two rational numbers with the same sign is (positive/negative).
- The order of operations for calculations involving rational numbers is:
  - Perform operations inside parentheses (first/last).
  - Divide and (subtract/multiply) in order from left to right.
  - Add and (subtract/multiply) in order from left to right.

### Check Your Understanding

- Estimate and calculate. Show your work.
 

<p>a) <math>3.75 - 1.25</math></p> <p>b) <math>-7.05 - 10.82</math></p> <p>c) <math>-4.51 + (-9.33)</math></p>	<p>d) <math>8.04 + (-1.25)</math></p> <p>e) <math>-3.9(8.9)</math></p>
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- Estimate and calculate. Show your work.
 

<p>a) <math>-6.2 \times (-4.3)</math></p> <p>b) <math>16.12 \div (-3.1)</math></p>	<p>c) <math>-5.7 \div 0.34</math></p>
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- Calculate. Express your answer to the nearest thousandth, if necessary. Show your work.
 

<p>a) <math>-3.2(7.8)</math></p>	<p>b) <math>-6.7 \div (-1.3)</math></p>
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8. Calculate. Show your work.

a)  $-3.2(3.6 - 7.1)$

b)  $-1.8 \times 6.1 + 3.8(-0.9)$

c)  $-2.2[4.8 - (-1.7)]$

d)  $9.7 + 4.8 - 19.24 \times 5.2$

e)  $(7.04 - 9.26)(9.13 - 4.78)$

f)  $8.07 + 3.1[9.5 - (-8.7)]$

9. Samir owns some company shares. The value of each share rose and dropped over a week, as shown in the table. What was the total change in value of each share after the week? Show your work.

Mon	Tues	Wed	Thurs	Fri
+0.21	-0.03	-0.11	-0.09	+0.02

10. Complete each statement.

a)  $-12.5 - \square = -5.6$

b)  $2.7 + \square = -7.1$

c)  $-8.58 \div \square = 3.9$

d)  $-3.2 \times \square = 24$

11. Determine the average of each set of numbers. Express your answer to the nearest hundredth, if necessary.

a)  $-3.6, 0.9, -4.5, -2.7, -0.5, 3.6, 1.7$

b)  $9.6, -8.9, -12.6, -2.7, -7.5, 23.6$

12. The average high temperature in January in Winnipeg is  $-12.7^\circ\text{C}$ . In Victoria, it is  $6.9^\circ\text{C}$ .

a) Write an expression to represent the difference between these temperatures.

b) Calculate the answer.

13. A submarine was floating on the surface of the water. It then descended at a rate of  $0.5\text{ m/s}$  for 3 min. Then, it ascended at a rate of  $0.7\text{ m/s}$  for 1 min and 15 s.

a) Write an expression to determine the depth of the submarine after these two moves.

b) Calculate the answer. Show your work.

## 2.3 Problem Solving With Rational Numbers in Fraction Form

MathLinks 9, pages 63–71

### Key Ideas Review

Select words from column B to complete the statements in column A.

A	B
1. The addition of rational numbers can be modelled on a _____	a) adding the opposite b) improper fractions
2. Subtraction can be modelled on a number line by _____	c) multiplication and division
3. Rational numbers expressed as mixed numbers can be added, subtracted, multiplied, and divided by first writing them as _____	d) positive fractions e) number line
4. Rational numbers expressed as proper or improper fractions can be added, subtracted, multiplied, and divided in the same way as _____	
5. The sign of the product or quotient can be predicted from the sign rules for _____	

### Check Your Understanding

6. Estimate and calculate. Show your work.

a)  $-\frac{3}{10} + \left(-\frac{7}{10}\right)$

b)  $\frac{1}{3} + \frac{5}{6}$

7. Estimate and calculate. Show your work.

a)  $\left(-\frac{3}{5}\right) \times \frac{2}{3}$

b)  $\left(-\frac{4}{9}\right) \times \left(-\frac{3}{8}\right)$

c)  $3\frac{1}{2} + \left(-1\frac{3}{4}\right)$

d)  $3\frac{1}{4} - \left(-4\frac{5}{12}\right)$

c)  $\left(-\frac{6}{7}\right) \left(-\frac{5}{12}\right)$

d)  $-\frac{5}{6} \times 2\frac{1}{4}$

8. Estimate and calculate. Show your work.

a)  $-\frac{7}{8} \div -\frac{3}{4}$

b)  $1\frac{1}{2} \div \left(-1\frac{3}{8}\right)$

c)  $-3\frac{2}{3} \div \left(-1\frac{1}{6}\right)$

d)  $\frac{1}{3} \div \frac{3}{4}$

9. Luc has 1 h of homework to do. He has assignments to complete for social studies and math, and a science test to begin studying for. He spends  $\frac{2}{5}$  of the time completing the social studies assignment, and  $\frac{1}{3}$  of the time on math. How much time does Luc have left to study for the science test? Show two ways of answering this question.

10. Alyssa purchased 120 shares of ElecTeck stock for  $1\frac{1}{4}$  dollars per share. She also purchased 200 shares of Apexal stock for  $\frac{4}{5}$  of a dollar per share. After six months, the value of ElecTeck stock went up by  $1\frac{1}{2}$  and Apexal lost  $\frac{1}{4}$  of its value. What was the total value of Alyssa's stock after six months?

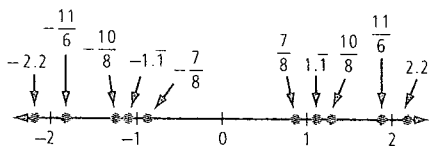
11. A pine tree growing on shallow soil has roots extend one-eleventh of its height below the surface. The roots extend 0.87 m deep. How high is the tree, to the nearest tenth? Draw a diagram to represent the situation. Justify your answer.

## 2 Get Ready

- a) 152.85714 b) 272.430 c) 390.166 00
- It is less than 349 since we are multiplying by a number less than 1.
- a)  $\frac{3}{4}$ , 0.75 b)  $\frac{4}{10}$ , 0.4
- a)  $\frac{7}{10}$ ,  $\frac{3}{4}$  b)  $\frac{2}{7}$ ,  $\frac{1}{3}$ ,  $\frac{3}{8}$
- a)  $\frac{1}{5} + \frac{3}{10}$  b)  $\frac{2}{3} - \frac{3}{5}$  6. a)  $\frac{7}{8}$  b)  $\frac{1}{12}$
- a)  $\frac{5}{8}$  b)  $\frac{33}{8}$  or  $4\frac{1}{8}$  8. a) 10 b)  $\frac{10}{3}$  or  $3\frac{1}{3}$

### 2.1 Comparing and Ordering Rational Numbers

- a) 2.1,  $-\frac{3}{2}$ , 3, -55  
b) 3.0,  $\sqrt{9}$ ,  $-\frac{21}{-7}$ ,  $\frac{3}{1}$
- a)  $-\frac{14}{5}$ , -2.1,  $-\frac{3}{4}$ ,  $\frac{0}{3}$ ,  $\frac{3}{4}$ ,  $\frac{5}{4}$ ,  $\frac{6}{4}$ , 1.8  
b)  $-\frac{3}{4}$ ,  $\frac{3}{4}$  c)  $\frac{3}{4}$
- a) C b) B c) A d) E e) D  
f) Example: I estimated where the rational number would go on the number line, then identified the related letter.
- a)-b)



- a)  $-\frac{3}{2}$  b)  $6.\bar{8}$  c)  $2\frac{1}{5}$
- a) 1.125,  $-1.\bar{6}$ ,  $0.\bar{54}$   
b) -1.7,  $-1\frac{2}{3}$ , 0.511,  $\frac{6}{11}$ ,  $\frac{9}{8}$
- a)  $0.8\bar{3}$ , -2.4, -1.75  
b)  $\frac{5}{6}$ , 0.7,  $-1\frac{3}{4}$ , -2.1,  $-\frac{12}{5}$
- Examples: a)  $-\frac{6}{8}$  b)  $-\frac{2}{3}$  c)  $\frac{3}{2}$  d)  $-\frac{10}{6}$
- Examples: a)  $-\frac{5}{8}$  b)  $\frac{7}{9}$  c)  $-\frac{1}{4}$  d)  $-\frac{8}{7}$
- a)  $\frac{1}{3}$  b)  $\frac{3}{5}$  c)  $-1\frac{1}{6}$  d)  $-\frac{3}{4}$
- a)  $\frac{2}{3}$  b)  $-\frac{11}{12}$  c)  $-\frac{7}{4}$  d)  $-2\frac{5}{6}$
- a) 0.25, 0.125; Example: 0.13  
b)  $-0.\bar{6}$ , -0.8; Example: -0.7

- a)  $6.5^\circ\text{C}$ ,  $0.1^\circ\text{C}$ ,  $-15.7^\circ\text{C}$ ,  $-17.0^\circ\text{C}$ ,  $-22.1^\circ\text{C}$ ,  $-23.2^\circ\text{C}$ ,  $-23.6^\circ\text{C}$ ,  $-32.2^\circ\text{C}$   
b)  $-22.2^\circ\text{C}$
- a) > b) > c) < d) =

### 2.2 Problem Solving With Rational Numbers in Decimal Form

- adding 2. negative 3. positive
- a) first b) multiply c) subtract
- a) 3, 2.5 b) -18, -17.87 c) -14, -13.84  
d) 7, 6.79
- a) 24, 26.66 b) -5, -5.2 c) -36, -34.71
- a) -24.96 b) 5.154 c) -16.765
- a) 11.2 b) -14.4 c) -14.3 d) 10.8  
e) -85.548 f) 64.49
- 0
- a) -6.9 b) -9.8 c) -2.2 d) -7.5
- a) -0.73 b) 0.25
- a) Example:  $-12.7 - 6.9$  b)  $19.6^\circ\text{C}$
- a) Example:  
 $[-0.5(3 \times 60)] + 0.7[(1 \times 60) + 15]$   
b) -37.5 m

### 2.3 Problem Solving With Rational Numbers in Fraction Form

- e) number line
- a) adding the opposite
- b) improper fractions
- d) positive fractions
- c) multiplication and division
- a)  $-1\frac{1}{2}$ , -1 b) 1,  $1\frac{1}{6}$   
c)  $1, 1\frac{3}{4}$  d)  $7\frac{1}{2}$ ,  $7\frac{2}{3}$
- a) -1,  $-\frac{2}{5}$  b)  $\frac{1}{4}$ ,  $\frac{1}{6}$   
c)  $\frac{1}{2}$ ,  $\frac{5}{14}$  d) -2,  $-1\frac{7}{8}$
- a) 1,  $1\frac{1}{6}$   
b) -1,  $-1\frac{1}{11}$   
c) 4,  $3\frac{1}{7}$  d)  $\frac{1}{2}$ ,  $\frac{4}{9}$
- Examples:  
 $1 - \frac{2}{5} - \frac{1}{3} = \frac{4}{15}$  h,  
 $60 - (\frac{2}{5} \times 60) - (\frac{1}{3} \times 60) = 16$  min
- \$495 11. 9.6 m