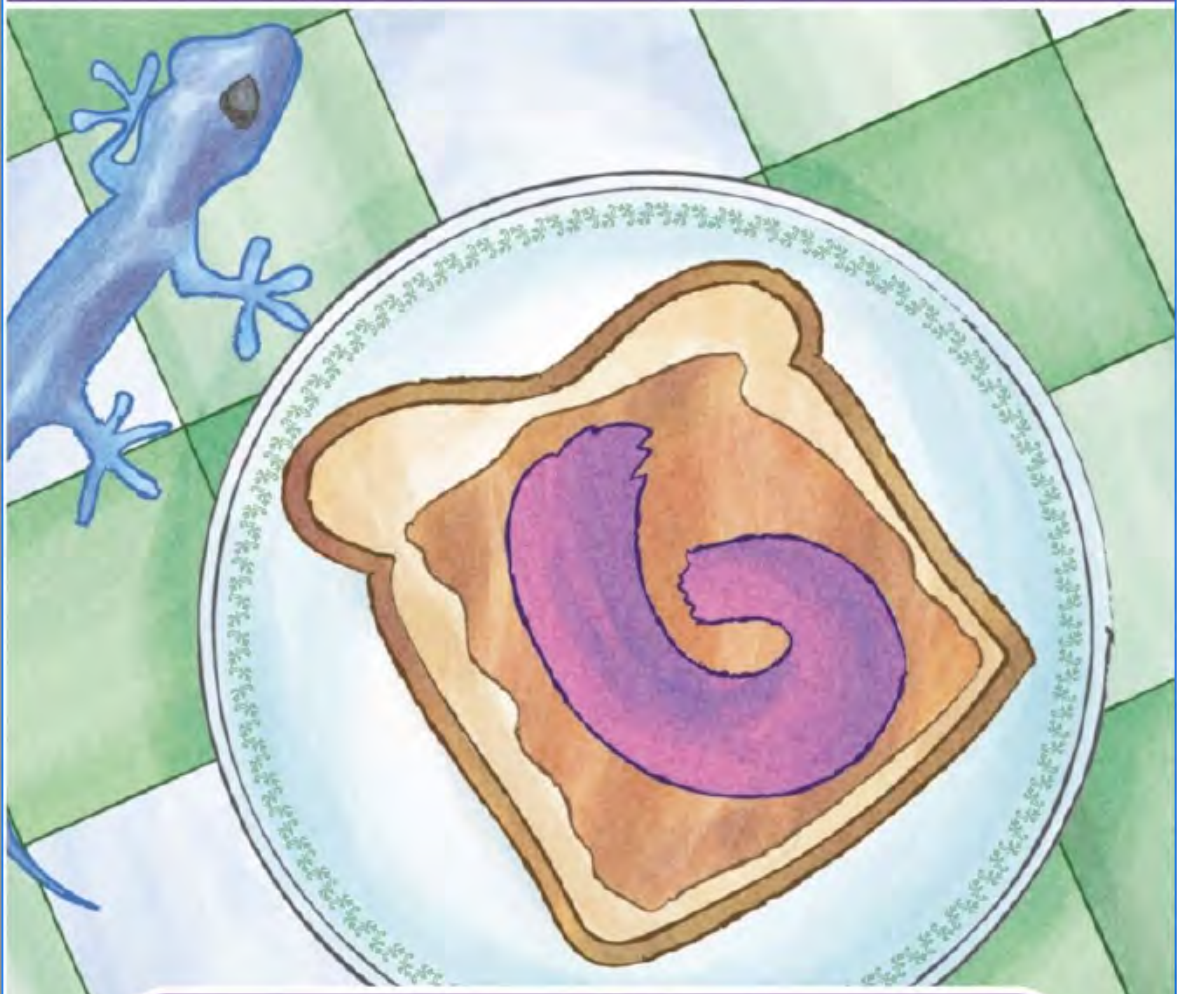
SIXTH GRADE MATH WITH CONFIDENCE

PART B

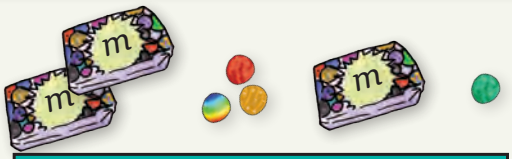


STUDENT WORKBOOK PART B

KATE SNOW

Lesson Activities

A



$2m + 3 + m + 1$

Evaluate the expression for $m = 20$.

B

Terms and Constants

The **terms** of an expression are the parts that are added or subtracted together.

Terms without variables are called **constants**, because they stay constant and don't change.

Like terms are terms that are like each other.

- Terms with the same variable are like terms.
- Constants are like terms.

Ex. How many terms are in this expression? How many constants?

$2m + 3 + m + 1$

4 terms

$2m + 3 + m + 1$

2 constants

Ex. Identify the like terms in this expression.

$2m + 3 + m + 1$

$2m$ and m both have the same variable, so they are like terms.

3 and 1 are both constants, so they are like terms.

Combine Like Terms

To simplify expressions, combine the like terms.

If two terms have the same variable, add or subtract their coefficients. (If a variable doesn't have a coefficient, we think of its coefficient as 1.)

If two terms are constants, add or subtract the constants.

Ex. Simplify the expression.

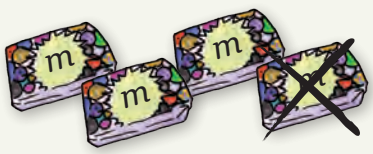
$2m + m = 3m$

$2m + 3 + m + 1$

$\mathbf{3m + 4}$

$3 + 1 = 4$

$2m + 3m$



$4m - m$

$2 + m + 3$

C

Four in a Row (2-Player Game)

$x + x + x$	$4x + 5$	$5x - 3x + 4$	$6x$
$x + 9$	$x + 6x$	$9x$	$2 + 3 + 4x$
$7x - 2x$	$8x$	$8x - 2x$	$2x + 4$
$7x$	$10x - x$	$2x + 1$	$x + 7 + 2$
$2x + 5 - 4$	$3x$	$x + 7x$	$5x$

Practice

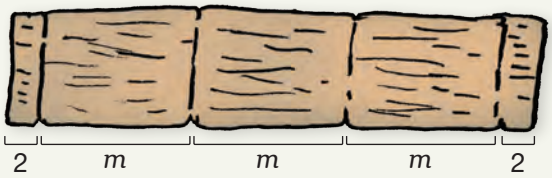
Circle the expressions that are equivalent to the expression in the star.

$5a$	$3b$	$2y + 6$	$4d + 10$
$3a + 2a$	$8b - 5b$	$2y + 5 + 3$	$5d - 2d + 10$
$3 \cdot 2a$	$2b + 1$	$y + y + 3 + 3$	$3d + d + 10$
$5 + a$	$b + b + b + b$	$2 + y + 6$	$4d + 7 + 3$
$a + a + a + a + a$	$4b - b$	$3y - y + 6$	$2d + 5 + 2d + 5$

Answer the questions. Write your expressions in simplest form.

Quinn makes a rectangular banner. The banner is 20 cm wide and g cm long. Write an expression that tells the banner's perimeter.

Greg glues together 3 identical wood panels. Each panel is m inches long. Then, he adds a 2-inch border on either end. Write an expression that tells the total length.



Review

Write the decimal equivalent for each fraction. Then, write <, >, or = in the circles.

$\frac{1}{2}$ = _____ $\frac{1}{4}$ = _____ $\frac{3}{4}$ = _____	$\frac{1}{5}$ = _____ $\frac{2}{5}$ = _____	$\frac{3}{5}$ = _____ $\frac{4}{5}$ = _____
$1\frac{1}{2}$ ◯ 1.6	$2\frac{1}{4}$ ◯ 2.097	$4\frac{3}{4}$ ◯ 4.6
$3\frac{2}{5}$ ◯ 3.517	$5\frac{4}{5}$ ◯ 5.8	$7\frac{3}{5}$ ◯ 7.6001

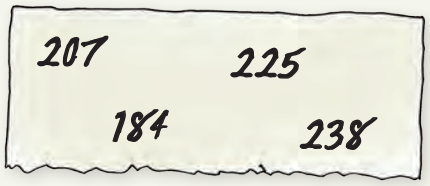
Find the product. Write your answers in simplest form. Convert improper fractions to mixed numbers.

$\frac{3}{15} \times \frac{5}{6} =$	$\frac{8}{2} \times \frac{6}{10} =$	$\frac{9}{8} \times \frac{8}{7} =$

Solve. Write the equations you use in the work space.

Lucy's family picks 11.7 kg of blueberries. They want to divide the blueberries into 8 equal bags to freeze. How many kilograms of blueberries should they put in each bag? Write your answer with 2 decimal digits.

Ian received the following scores at the bowling tournament.



What is the sum of his scores?

What is the average of his scores? Write your answer with 1 decimal digit.

WORK SPACE

Unit Wrap-Up

Write a fraction that is equivalent to each percentage. Write the fractions in simplest form.

25% =	75% =	$33\frac{1}{3}\%$ =	$66\frac{2}{3}\%$ =
10% =	20% =	30% =	40% =
50% =	60% =	70% =	80% =

Convert the percentages to decimals.

37% = _____ 99% = _____

10% = _____ 6% = _____

Convert the fractions to percentages.

$\frac{49}{100}$ = $\frac{3}{100}$ =

$\frac{7}{20}$ = $\frac{8}{25}$ =

Use mental math to complete.

50% of 160 = _____	25% of 200 = _____	$33\frac{1}{3}$ % of 900 = _____
25% of 160 = _____	75% of 200 = _____	$66\frac{2}{3}$ % of 900 = _____
10% of 70 = _____	20% of 25 = _____	10% of 40 = _____
30% of 70 = _____	120% of 25 = _____	5% of 40 = _____

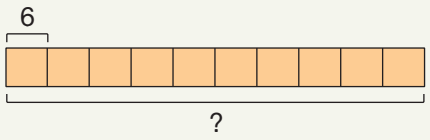
Use mental math or written equations to complete.

75% of 320

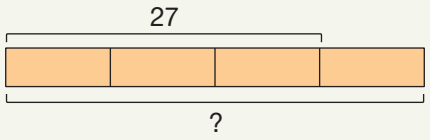
80% of 300

150% of 110

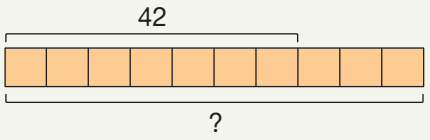
Use the bar models to complete.



10% of _____ = 6



75% of _____ = 27



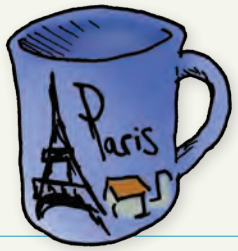
70% of _____ = 42

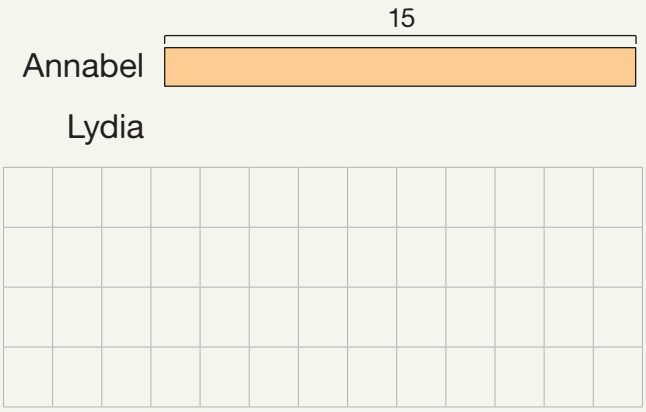
Unit Wrap-Up

Use bar models to solve.

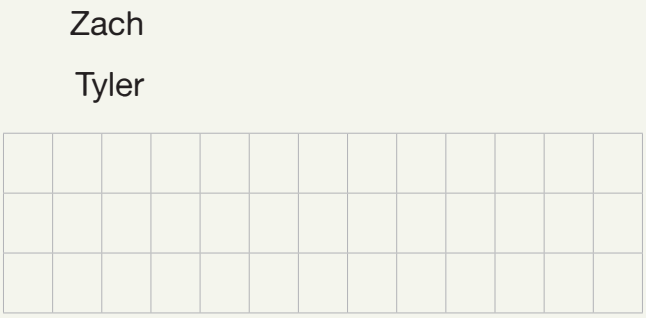
Annabel and Lydia both collect mugs. Annabel has 15 mugs. Lydia has 20% fewer mugs than Annabel. How many mugs does Lydia have?

How many more mugs does Annabel have than Lydia?





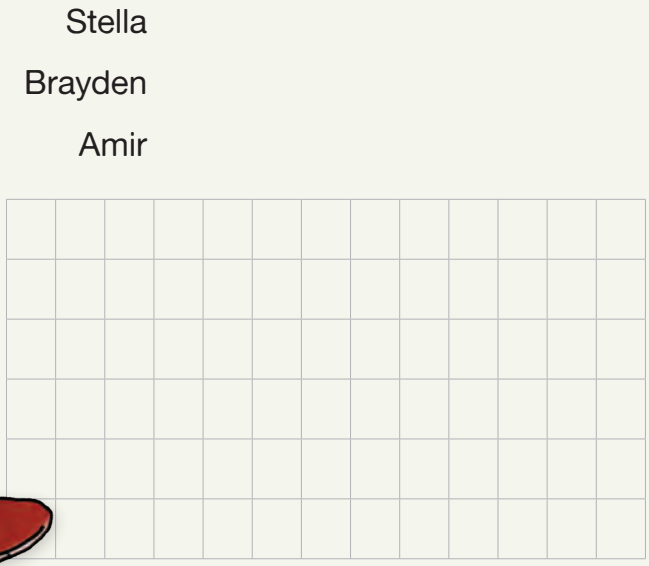
Zach and Tyler are on the swim team. At the last practice, Zach swam 60 laps. He swam 75% as many laps as Tyler. How many laps did Tyler swim?



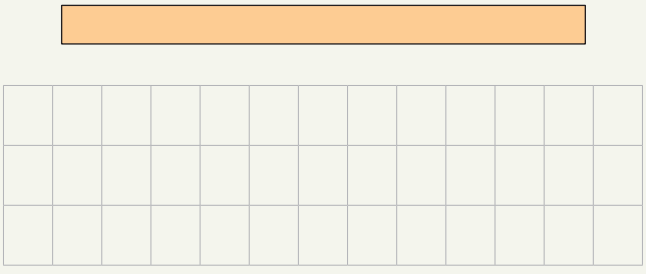
Stella, Brayden, and Amir are on the track team. Last week, Stella ran 50 laps. Brayden ran 90% as many laps as Stella. How many laps did Brayden run?

Amir ran $33\frac{1}{3}$% more laps than Brayden. How many laps did Amir run?

Who ran the most laps?



★ Last month, Nova spent 60% of her money and saved the rest. She saved $36. How much money did she spend?



Lesson Activities

A

Cross out 3 loose marbles on each side of the scale.

a = _____

Cross out 1 loose marble on each side of the scale.

b = _____

Cross out 4 loose marbles on each side of the scale.

c = _____

B

Solve Equations, Part 1

To solve an equation, we change both sides until we have the variable by itself on one side of the equation.

The two sides of an equation are like the two sides of a scale. If you change one side of the equation, you must change the other side in the same way.

1. Identify what happens to the variable in the equation. Do the opposite operation to both sides of the equation.
2. Simplify both sides.
3. Substitute the solution into the equation to check your answer.

Ex. Solve: $x + 18 = 27$

In this equation, 18 is added to x. So, we subtract 18 from both sides to get x by itself on one side of the equation.

$$\begin{array}{rcl} x + \cancel{18} & = & 27 \\ -\cancel{18} & & -18 \\ \hline x & = & 9 \end{array}$$

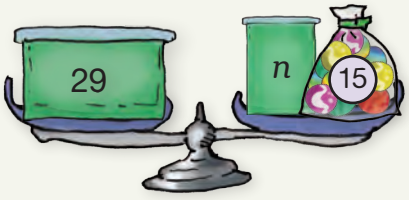
Check:

$9 + 18 \stackrel{?}{=} 27$

$27 = 27$ ✓

$p + 12 = 47$

Check:



$29 = n + 15$

Check:

Practice

Solve each equation. Show all your steps. Then, substitute the solution into the equation to check that it is correct.

$a + 3 = 15$

Check:

$30 = b + 1$

Check:

$c + 4 = 4$

Check:

$8 = d + 2$

Check:

$46 = e + 22$

Check:

$100 = 85 + f$

Check:

Follow the directions.

I'm thinking of a secret number. The sum of my number and 35 equals 50.

Write an equation to match the clue. Use m to stand for the secret number.

Solve the equation to find the secret number. Show all your steps.

I'm thinking of a secret number. My number increased by 47 equals 89.

Write an equation to match the clue. Use n to stand for the secret number.

Solve the equation to find the secret number. Show all your steps.

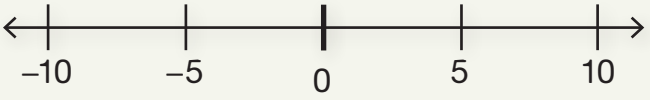
Review

Follow the directions.

I have more than $5 in my bank account.

Write an inequality to match the statement. Use m to stand for the amount of money.

Graph the inequality on the number line.



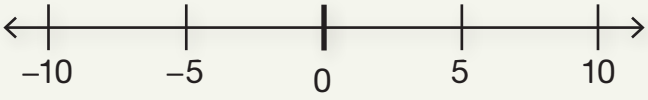
Circle the numbers that make the inequality true. X the numbers that do not make the inequality true.

–5	0	5	10

The temperature is less than 10 degrees.

Write an inequality to match the statement. Use t to stand for the temperature.

Graph the inequality on the number line.



Circle the numbers that make the inequality true. X the numbers that do not make the inequality true.

–5	0	5	10

Rewrite each division problem as a multiplication problem and solve. Write your answers in simplest form. Convert improper fractions to whole numbers or mixed numbers.

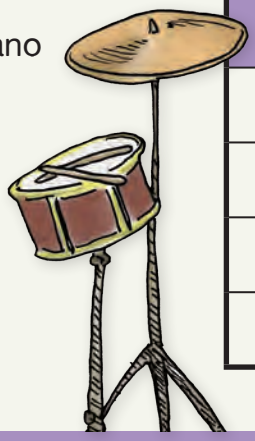
$3 \div \frac{1}{4} =$

$3 \div \frac{3}{4} =$

$3 \div 1\frac{1}{4} =$

Use mental math to complete the chart.

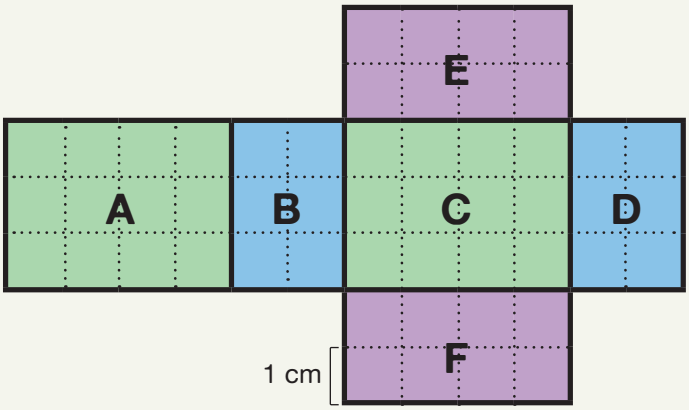
- 16 children play the guitar.
- 25% more children play the piano than play the guitar.
- 50% fewer children play the drums than play the piano.
- 20% fewer children play the clarinet than play the drums.



Instrument	Number of Children
Guitar	
Piano	
Drums	
Clarinet	

Lesson Activities

A



	Area (cm^2)
A	
B	
C	

	Area (cm^2)
D	
E	
F	

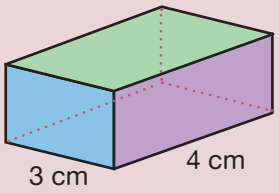
Total area: _____

B

Surface Area of Rectangular Prisms and Cubes

The surface area of a 3-D solid is the total area of all its faces. To find surface area, we find the area of each face and then add the areas.

Ex. What is the surface area of the box?

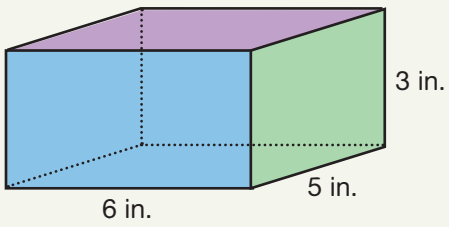


Area of each green face: 4 cm × 3 cm = 12 cm^2

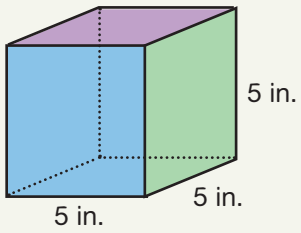
Area of each blue face: 2 cm × 3 cm = 6 cm^2

Area of each purple face: 4 cm × 2 cm = 8 cm^2

12 cm^2 + 12 cm^2 + 6 cm^2 + 6 cm^2 + 8 cm^2 + 8 cm^2 = **52 cm^2**



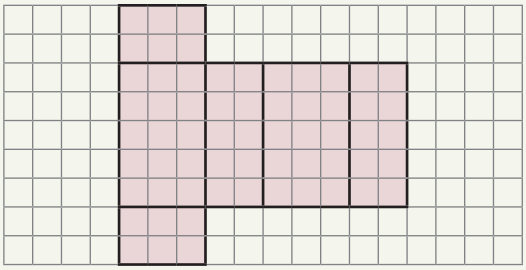
Surface area: _____

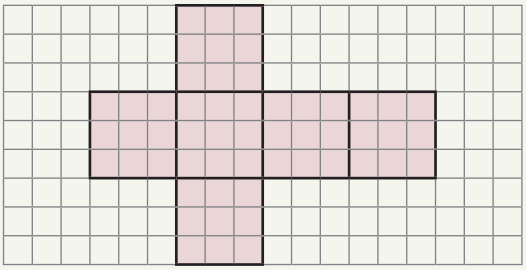


Surface area: _____

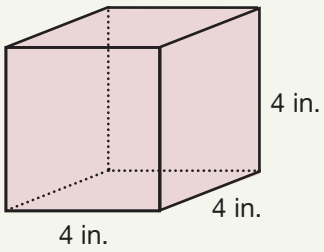
Practice

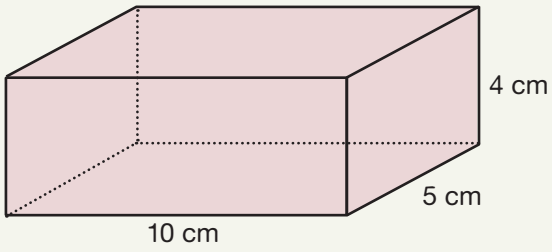
Use the net to find the surface area of the matching 3-D solid. Each small square represents 1 $cm.^2$





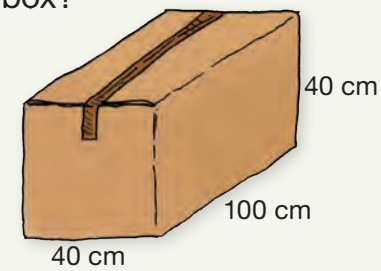
Find the surface area of each solid.



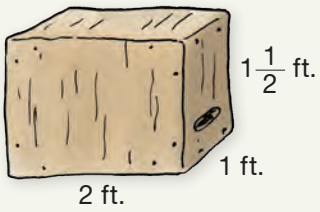


Solve. Write the equations you use.

What is the surface area of the cardboard box?



Willow builds this closed box out of wood. What is the surface area of the box?



Review

Solve each equation. Show all your steps. Then, substitute the solution into the equation to check that it is correct.

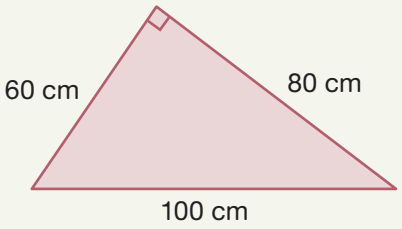
$125 = s + 46$

Check:

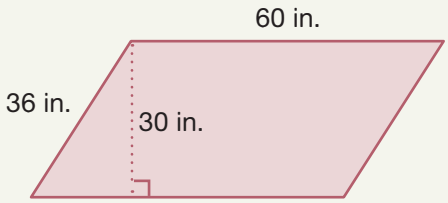
$8t = 72$

Check:

Find the area. Write the equations you use.



Area: _____ sq. cm



Area: _____ sq. in.

Evaluate.

$2^4 =$ _____

$7^2 =$ _____

$4^3 =$ _____

$1^9 =$ _____

$34^1 =$ _____

$10^4 =$ _____

$7 \times 10^3 =$ _____

$2^3 \times 10^2 =$ _____

$5^2 \times 10^6 =$ _____

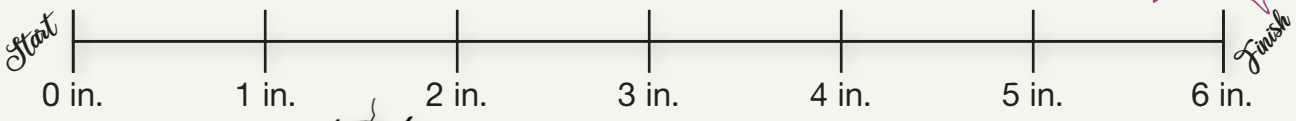
Solve. Write the equations you use.

What is the volume of the aquarium in cubic feet?

Myles pours water into the aquarium until the water is 8 inches high. What is the volume of the water in cubic feet?

Lesson Activities

A



The ladybug travels 6 inches in 6 seconds.

_____ inches per second

The snail travels 6 inches in 12 seconds.

_____ inches per second

The ant travels 6 inches in 3 seconds.

_____ inches per second

B

Speed

Speed is a special type of unit rate that compares distance to one unit of time.

$$\frac{\text{distance}}{\text{time}} = \text{speed}$$

Measurement units for speed always include both a distance unit and a time unit. We sometimes use p to stand for "per" in measurement units for speed.

miles per hour
miles/hour
mph

Ex. James is training for a marathon. On Sunday, he ran 12 miles. It took him 2 hours. What was his speed (in miles per hour)?

$$\frac{12 \text{ miles}}{2 \text{ hours}} = \textbf{6 miles per hour}$$

Ex. On Monday, James ran 10 miles. It took him $1\frac{1}{2}$ hours. What was his speed (in miles per hour)?

$$\frac{10 \text{ miles}}{1\frac{1}{2} \text{ hours}} \rightarrow 10 \div 1\frac{1}{2}$$

$$\frac{10}{1} \div \frac{3}{2} \rightarrow \frac{10}{1} \times \frac{2}{3} = \frac{20}{3} = \textbf{6}\,\frac{\textbf{2}}{\textbf{3}}\,\textbf{mph}$$

Running Log

	Distance (mi.)	Time (hr.)	Speed (mph)
Tuesday	18	3	
Wednesday	19	3	
Thursday	21	$4\frac{2}{3}$	
Saturday	10	$1\frac{1}{4}$	

Practice

Circle the speeds that are equivalent to the speed in the box.

40 miles per hour	$\frac{80 \text{ mi.}}{2 \text{ hr.}}$	$\frac{60 \text{ mi.}}{3 \text{ hr.}}$	$\frac{120 \text{ mi.}}{3 \text{ hr.}}$	$\frac{40 \text{ mi.}}{1 \text{ hr.}}$	$\frac{40 \text{ km}}{1 \text{ hr.}}$
30 kilometers per hour	$\frac{10 \text{ km}}{2 \text{ hr.}}$	$\frac{90 \text{ km}}{3 \text{ hr.}}$	$\frac{300 \text{ km}}{10 \text{ hr.}}$	$\frac{60 \text{ km}}{2 \text{ hr.}}$	$\frac{60 \text{ km}}{2 \text{ min.}}$
10 feet per second	$\frac{50 \text{ ft.}}{5 \text{ sec.}}$	$\frac{80 \text{ ft.}}{10 \text{ sec.}}$	$\frac{20 \text{ mi.}}{2 \text{ hr.}}$	$\frac{40 \text{ ft.}}{4 \text{ sec.}}$	$\frac{100 \text{ ft.}}{10 \text{ sec.}}$

Jennie made a chart of her bike rides. Use the chart to find her speed for each ride. Write your answers as whole numbers or mixed numbers in simplest form.

Day	Distance (km)	Time (hr.)	Speed (km/hr.)
Saturday	48	3	
Monday	35	$2\frac{1}{2}$	
Wednesday	27	2	
Friday	60	5	

Solve. Write the equations you use.

The Olympic sprinter runs 100 meters in 10 seconds. What is the sprinter's speed in meters per second?

The cheetah runs 24 meters in 2 seconds. What is its speed in meters per second?

Which is faster, the cheetah or the sprinter?

Review

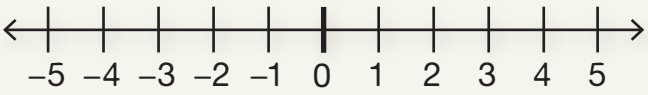
Use long division to solve. Use the multiplication table to help.

$35\overline{)287}$ $35\overline{)2,876}$ $35\overline{)82.95}$

	× 35
1	35
2	70
3	105
4	140
5	175
6	210
7	245
8	280
9	315

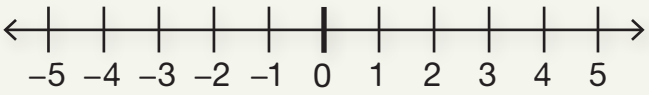
Graph each inequality on the number line. Then, circle the numbers that make the inequality true. X the numbers that do not make the inequality true.

$t > -4$



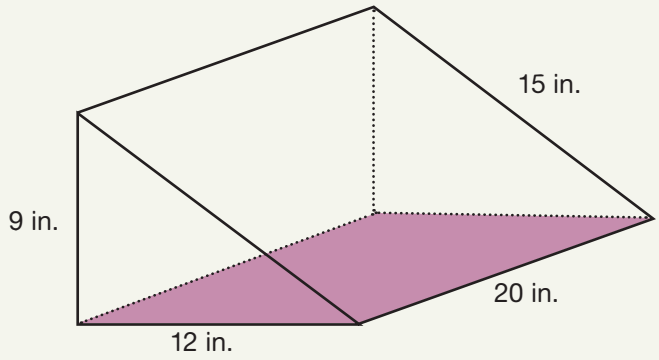
3.6 | $-2\frac{1}{2}$ | −4 | −5

$m \leq -1$



$-3\frac{3}{4}$ | −1 | 1 | 0

Find the surface area.



Surface area: _____

Lesson Activities

A

$53\% = \frac{53}{100} = \underline{0.53}$ $\quad 9\% = \frac{\quad}{100} = \underline{\quad\quad}$ $\quad 176\% = \frac{\quad}{100} = \underline{\quad\quad}$

$70\% = \frac{\quad}{100} = \underline{\quad\quad}$ $\quad 41\% = \frac{\quad}{100} = \underline{\quad\quad}$ $\quad 208\% = \frac{\quad}{100} = \underline{\quad\quad}$

B

Use Decimal Multiplication to Find Percentages

In math, "of" often means multiply. We can use decimals to find a percentage of a number.

1. Convert the percentage to a decimal.
2. Multiply the decimal by the number.

Ex. Faith buys a board game for $38. She lives in a state that charges 6% sales tax. How much is the sales tax on the board game?

What is 6% of 38?

6% = 0.06

$$\begin{array}{r} {\scriptstyle 4} \\ 38 \\ \times 0.06 \\ \hline \mathbf{\$2.28} \end{array}$$

Decimal digits: 0 + 2 = 2

Ex. What is the total cost of the game?

$38.00 + $2.28 = **$40.28**

C

Pop the Percentage (1-Player Game)

Practice

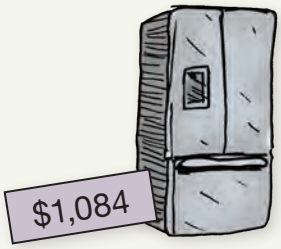
Matthew lives in a state that charges 6% sales tax on all purchases. Find how much sales tax he would need to pay on these items. Write your answers with 2 decimal digits.

Sales tax:_____

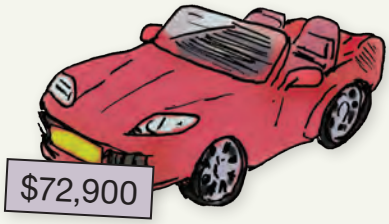
Sales tax:_____

Sales tax:_____

Sales tax:_____



Sales tax:_____

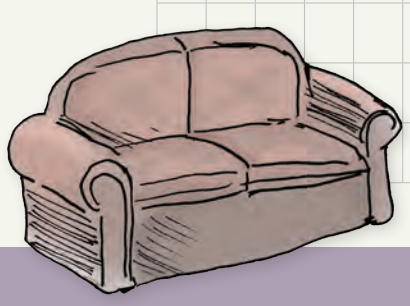


Sales tax:_____

Solve. Write your equations in the work space. Write your answers with 2 decimal digits.

The couch's regular price is $1,799. Today, it is on sale for 45% off. How much do you save if you buy the couch on sale?

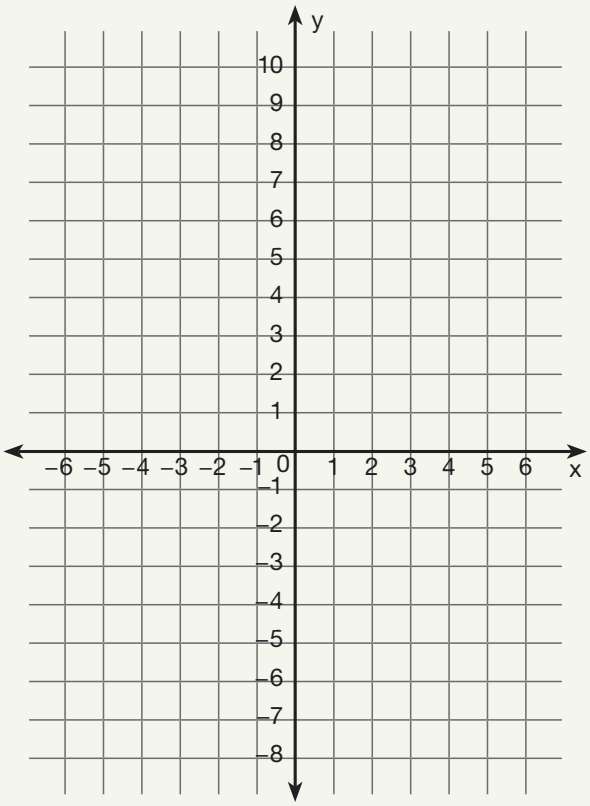
What is the sale price of the couch?



Review

Plot the points. Then, connect the points in order with straight lines to create a shape.

(0,9)
(–2,6)
(–4,9)
(–4,5)
(–3,3)
(–1,2)
(–1,–3)
(–4,1)
(–1,–7)
(0,–7)
(1,–7)
(4,1)
(1,–3)
(1,2)
(3,3)
(4,5)
(4,9)
(2,6)
(0,9)



Use mental math to solve.

0.7 + _____ = 1	1.6 + _____ = 2	6.5 + _____ = 10
0.28 + _____ = 1	1.49 + _____ = 2	4.25 + _____ = 10
0.997 + _____ = 1	1.005 + _____ = 2	9.875 + _____ = 10

Complete the chart. Use mental math or write your equations in the work space.

Speed (miles per hour)	Time (hours)	Distance (miles)
60	3	
40	2	
	5	100
	6	60
50		200
40		200