

SECTION 2A **Ready To Go On? Skills Intervention**
2-1 Solving Linear Equations and Inequalities

Find these vocabulary words in Lesson 2-1 and the Multilingual Glossary.

Vocabulary		
equation	solution of an equation	linear equation in one variable
identity	contradiction	inequality

Solving Equations with Variables on Both Sides

Solve. $10 - 2x = 19 - 4x$

$$10 - 2x = 19 - 4x$$

$$\underline{-10 \quad -10}$$

$$\boxed{} = \boxed{} - 4x$$

$$\underline{+4x \quad +4x}$$

$$\boxed{} = 9$$

$$\frac{2x}{\boxed{}} = \frac{\boxed{}}{\boxed{}}$$

$$x = \underline{\quad}$$

To get the constant on one side of the equation, subtract 10 from both sides of the equation.

To get the variable on one side of the equation, add 4x to both sides of the equation.

To isolate x, divide both sides of the equation by ____.

Solve for x.

Solving Inequalities

Solve and graph. $\frac{3}{2}(2x + 8) \leq 15$

$$\frac{3}{2}(2x + 8) \leq 15$$

$$\frac{3}{2}(\underline{\quad}) + \frac{3}{2}(\underline{\quad}) \leq 15$$

$$\underline{\quad}x + \underline{\quad} \leq 15$$

$$\underline{-12} \quad \underline{-12}$$

$$\underline{\quad}x \leq \underline{\quad}$$

$$\frac{\boxed{}x}{3} \leq \frac{\boxed{}}{3}$$

$$x \leq \underline{\quad}$$

Distribute $\frac{3}{2}$ to both terms in the “parentheses.”

Multiply.

Subtract 12 from both sides to isolate the variable.

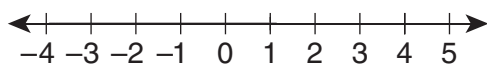
Divide both sides by 3 to isolate x. Do you need to reverse the inequality symbol? _____

Solve for x.

Graph the solution.

A(n) _____ circle should be used and

the arrow should point to the _____.



Test $x = 0$ in the original inequality.

Does your solution check? _____

$$\frac{3}{2}(2(0) + 8) \leq 15$$

$$\frac{3}{2}(8) \leq 15$$

$$\underline{\quad} \leq 15$$

SECTION 2A **Ready to Go On? Problem Solving Intervention**
2-1 Solving Linear Equations and Inequalities

Solving a linear equation requires isolating the variable on one side of the equation by using the properties of equality.

Isabella is paid a salary of \$600 per month plus a commission of 2% of the sales price of each house she sells. Find the value of the houses Isabella must sell in one month to earn \$6600.

Understand the Problem

1. What are you trying to determine? _____
2. What two things make up Isabella’s monthly income?

3. What part of Isabella’s monthly income is always the same, or constant? _____
4. What part of Isabella’s monthly income changes each month? _____

Make a Plan

5. What percentage of each house sale does Isabella earn? _____
6. What is the decimal equivalent of 2%? 2% = _____
7. If Isabella sells *no* houses in one month, how much does she earn? _____
8. If Isabella sold a house for \$100,000, how much *commission* would she earn?
 2% of \$100,000 = 0.02(\$100,000) = \$_____
9. If Isabella sold only one house for \$100,000 during the month, write a numerical expression to show much money she would earn for the month. _____ + _____(_____)
10. How much money is Isabella hoping to earn? _____

Solve

11. If h is the value of the houses Isabella sells, represent the situation with an equation.

$$600 + (\text{_____})h = \text{_____}$$

12. Solve the equation for h .

$$600 + \text{_____}h = \text{_____}$$

$$\quad -600 \quad -600$$

$$\text{_____}h = \text{_____}$$

$$h = \text{_____}$$

13. Isabella must sell \$_____ worth of houses in one month to earn \$6600.

Look Back

14. Substitute your value for h into the original equation from Exercise 11.

$$600 + \text{_____}(\text{_____}) = 6600. \quad \text{Does the left side equal the right side? } \text{_____}$$

SECTION 2A **Ready to Go On? Skills Intervention**
2-2 Proportional Reasoning

Find these vocabulary words in Lesson 2-2 and the Multilingual Glossary.

Vocabulary				
ratio	proportion	rate	similar	indirect measurement

Solving Proportions
 Solve each proportion.

A. $\frac{x}{8} = \frac{9}{4}$

When a proportion contains a variable, use cross products to solve for the _____.

$$\frac{x}{8} \times \frac{9}{4}$$

$4x = 9(\underline{\quad})$ Set the cross products equal.

$4x = \underline{\quad}$ Multiply.

$\frac{4x}{\square} = \frac{\square}{\square}$ Divide by $\underline{\quad}$ to solve for x .

$x = \underline{\quad}$ Solve for x .

B. $\frac{4}{7} = \frac{6x}{9}$

$$\frac{4}{7} \times \frac{6x}{9}$$

$4(\underline{\quad}) = 6x(\underline{\quad})$ Set the cross products equal.

$36 = \underline{\quad}$ Multiply.

$\frac{36}{\square} = \frac{\square}{\square}$ Divide by $\underline{\quad}$ to solve for x .

$\underline{\quad} = x$ Simplify the fraction.

C. $\frac{4.5}{-x} = \frac{1.8}{3}$

$$\frac{4.5}{-x} \times \frac{1.8}{3}$$

$4.5(3) = 1.8(\underline{\quad})$ Set the cross products equal.

$13.5 = -\underline{\quad}$ Multiply. The product of a negative and a positive number is _____.

$\frac{13.5}{-\square} = \frac{\square}{-1.8}$ Divide by $\underline{\quad}$ to solve for x .

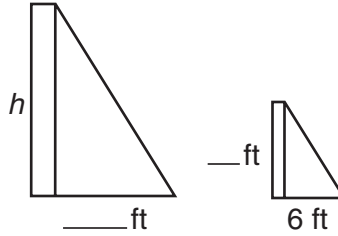
$\underline{\quad} = x$ Solve for x .

SECTION 2A **Ready to Go On? Problem Solving Intervention**
2-2 Proportional Reasoning

To measure an object that cannot be easily measured, use indirect measurement.

A cell tower casts a 30-ft shadow at the same time a 10-foot street sign casts a 6-ft shadow. How tall is the cell phone tower?

Understand the Problem



1. Label the diagram with the given information.
2. How long is the cell tower's shadow? _____
3. How tall is the street sign? _____
4. What does h in the diagram represent? _____

Make a Plan

5. Since the triangles formed by the shadows are similar, use a _____ to find h , the height of the cell phone tower.
6. The height of the cell phone tower corresponds to which part of the street sign?

7. The length of the cell phone shadow corresponds to which part of the street sign?

8. Complete the proportion: $\frac{\text{Height of cell phone tower}}{\boxed{}} = \frac{\text{Length of shadow of cell phone tower}}{\text{Length of shadow of street sign}}$

↓

$$\frac{h}{\boxed{}} = \frac{\boxed{}}{6}$$

Solve

9. Solve the proportion for h .
10. How tall is the cell phone tower? _____

$$\frac{h}{\boxed{}} = \frac{\boxed{}}{6}$$

$6h = (\boxed{})(\boxed{})$ Set Cross Products equal.

$6h = \underline{\hspace{2cm}}$ Multiply.

$h = \underline{\hspace{2cm}}$

Look Back

11. Substitute the value for h from Exercise 9 into the proportion $\frac{h}{10} = \frac{30}{6}$. If the cross products are equal, the value for h is correct. $6(\underline{\hspace{2cm}}) = 300$.

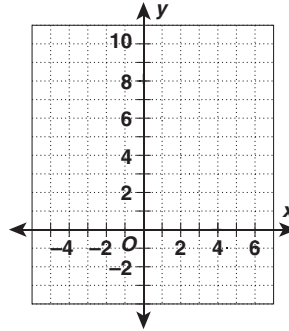
Does your answer check? _____

SECTION 2A **Ready to Go On? Skills Intervention**
2-3 Graphing Linear Functions

Find these vocabulary words in Lesson 2-3 and the Multilingual Glossary.

Vocabulary				
linear function	slope	y-intercept	x-intercept	slope-intercept form

Graphing Lines Using the Intercepts
 Find the intercepts of $4x + 2y = 16$ and graph the line.



Find the x-intercept.

Substitute 0 for y. $4x + 2(\underline{\quad}) = 16$

Multiply. $4x + \underline{\quad} = 16$

Divide. $\frac{4x}{\square} = \frac{16}{\square}$

Solve for x. $x = \underline{\quad}$

The x-intercept is the point ($\underline{\quad}$, 0).

Find the y-intercept.

Substitute 0 for x. $4(\underline{\quad}) + 2y = 16$

Multiply. $\underline{\quad} + 2y = 16$

Divide. $\frac{2y}{\square} = \frac{16}{\square}$

Solve for y. $y = \underline{\quad}$

The y-intercept is the point (0, $\underline{\quad}$).

Plot the two points you found on the graph. Draw a straight line through the points.

Graph Functions in Slope-Intercept Form
 Write the function $2y + 2x = 6$ in slope-intercept form. Then graph the function.

$2y + 2x = 6$

First, solve for y.

$\frac{-2x}{\square} \frac{-2x}{\square}$
 $2y = 6 - \underline{\quad}$

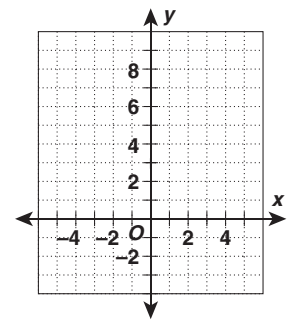
Subtract $\underline{\quad}$ from both sides.

$\frac{2y}{\square} = \frac{6 - 2x}{\square}$

Divide by $\underline{\quad}$ to isolate y.

$y = 3 - \underline{\quad}$

Simplify.



What is the coefficient of x? $\underline{\quad}$ This is the slope of the line.

What is the constant? $\underline{\quad}$ This is the y-intercept, or the y-coordinate when $x = 0$: (0, $\underline{\quad}$). Plot this point on the graph.

Is the slope positive or negative? $\underline{\quad}$

So, starting at the point of the y-intercept, move $\underline{\quad}$ unit(s) $\underline{\quad}$ and to the right one unit. Draw a straight line through the two points.

SECTION 2A **Ready to Go On? Skills Intervention**
2-4 Writing Linear Functions

Find this vocabulary word in Lesson 2-4 and the Multilingual Glossary.

Vocabulary
point-slope form

Writing Equations of Lines

Write the equation of the line through $(-1, 2)$ and $(2, 8)$ in slope-intercept form.

Let (x_1, y_1) be $(-1, 2)$ and (x_2, y_2) be $(2, \underline{\quad})$.

Complete to find the slope of the line. $m = \frac{y_2 - y_1}{x_2 - x_1} = \frac{\square - 2}{2 - \square} = \frac{\square}{\square} = \underline{\quad}$

Although you can choose either point, substitute for x in the equation of a line, $y = mx + b$, the x -coordinate of $(2, 8)$ and for y , the y -coordinate of $(2, 8)$.

$y = mx + b$

$\underline{\quad} = m(\underline{\quad}) + b$

Substitute values for x and y .

$\underline{\quad} = \underline{\quad}(\underline{\quad}) + b$

Substitute the value of m , the slope of the line.

$\underline{\quad} = \underline{\quad} + b$

Multiply.

$\underline{-4} \quad \underline{-4}$

Subtract 4 from both sides to solve for b .

$\underline{\quad} = b$

Solve for b .

Rewrite $y = mx + b$ using m and b .

$y = \underline{\quad}x + \underline{\quad}$

Writing Equations of Parallel and Perpendicular Lines

Write the equation of the line through $(-3, 7)$ and parallel to

$y = \frac{2}{3}x + 1$ in slope-intercept form.

What do you know about the slopes of parallel lines? _____

So, the slope of the line parallel to $y = \frac{2}{3}x + 1$ is equal to _____.

Substitute for x in the equation of a line, $y = mx + b$, the x -coordinate of $(-3, 7)$ and for y , the y -coordinate of $(-3, 7)$.

$y = mx + b$

$\underline{\quad} = m(\underline{\quad}) + b$

Substitute values for x and y .

$\underline{\quad} = \underline{\quad}(\underline{\quad}) + b$

Substitute the value of m , the slope of the line.

$\underline{\quad} = \underline{\quad} + b$

Multiply.

$\underline{+2} \quad \underline{+2}$

Add 2 to both sides to solve for b .

$\underline{\quad} = b$

Solve for b .

Rewrite $y = mx + b$ using m and b .

$y = \underline{\quad}x + \underline{\quad}$

SECTION
2A

Ready to Go On? Skills Intervention

2-5 Linear Inequalities in Two Variables

Find these vocabulary words in Lesson 2-5 and the Multilingual Glossary.

Vocabulary	
linear inequality	boundary line

Graphing Linear Inequalities

Solve for y in $y - 2 \leq 4$. Then graph.

$y - 2 \leq 4$

$+2$ $+2$ Add $\underline{\quad}$ to both sides to isolate the variable.

$y \leq \underline{\quad}$ Solve for y .

What is the boundary line? $y = \underline{\quad}$

Is the boundary line part of the solution? $\underline{\quad}$

Should the boundary line be solid or dashed? $\underline{\quad}$

Draw the boundary line on the graph.

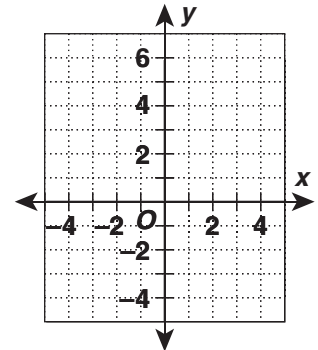
Should the region above or below the boundary line be shaded? $\underline{\quad}$

Choose a value for y , such as 0. Substitute this value into the inequality.

$y - 2 \leq 4$

$\underline{\quad} - 2 \leq 4$ Substitute 0 for y .

$\underline{\quad} \leq 4$ Does the point satisfy the inequality? $\underline{\quad}$



Graphing Linear Inequalities Using Intercepts

Solve for y in $4x - 2y > 12$. Then graph.

Find the x -intercept by substituting 0 for y .

Find the y -intercept by substituting 0 for x .

$4x - 2y = 12$

$4x - 2y = 12$

$4x - 2(0) = 12$

$4(0) - 2y = 12$

$4x - \underline{\quad} = 12$

$\underline{\quad} - 2y = 12$

$x = \frac{12}{\square} = \underline{\quad}$, so the x -intercept is $(\underline{\quad}, 0)$.

$y = \frac{12}{\square} = \underline{\quad}$, so the y -intercept is $(0, \underline{\quad})$.

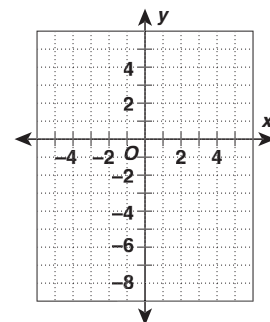
Use the x - and y -intercepts to draw the boundary line.

Should the boundary line be solid or dashed? $\underline{\quad}$

Substitute $(0, 0)$ in the inequality for x and y .

$4x - 2y > 12 \rightarrow 4(0) + 2(0) > 12$

If this point makes the statement true, shade the region containing the point. If not, shade the opposite region.



SECTION 2A **Ready to Go On? Problem Solving Intervention**
2-5 Linear Inequalities in Two Variables

When graphing a real-world application of an inequality graph only the part of the plane that includes realistic solutions.

Adam’s school is holding its annual musical. Tickets to evening shows cost \$6.50 and tickets to afternoon shows cost \$4.00. The school needs to make at least \$260 to cover expenses. Write and graph an inequality for the number of each type of ticket that must be sold to make a profit.

Understand the Problem

1. What are the two prices of the tickets? _____
2. How much money does the school need to make to cover expenses? _____

Make a Plan

3. If x is the number of evening tickets, what do you need to multiply x by to find the amount the school makes by selling evening tickets? _____
4. If y is the number of afternoon tickets, what do you need to multiply y by to find the amount the school makes by selling afternoon tickets? _____

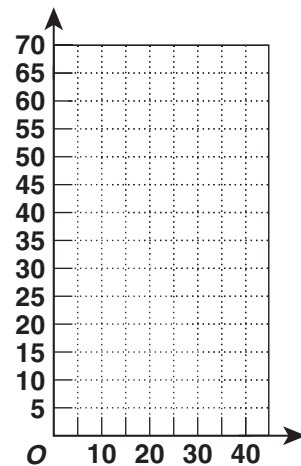
Solve

5. Complete the inequality to describe the situation.
 $6.5x + 4y$ 260

6. Find the intercepts of the boundary line.

y-intercept:	x-intercept:
$6.5(0) + 4y = 260$	$6.5x + 4(0) = 260$
_____ + $4y = 260$	$6.5x +$ _____ = 260
$y = \frac{260}{\text{□}}$	$x = \frac{260}{\text{□}}$
$y =$ _____	$x =$ _____

The y-intercept is $(0, \text{_____})$. The x-intercept is $(\text{_____, } 0)$.



7. Plot the intercepts and draw a line through the two points.
8. Should you shade above or below this boundary line? _____

Look Back

9. Test a point, such as $(0, 0)$ in the inequality from Exercise 5.

$6.5x + 4y > 260$
 $6.5(\text{___}) + 4(\text{___}) > 260$ Substitute 0 for x and 0 for y .
 $\text{___} > 260$ Is the inequality true? ___ Is the graph shaded correctly? ___

SECTION
2A

Ready To Go On? Quiz

2-1 Solving Linear Equations and Inequalities

Solve.

1. $21 + x = 4x$

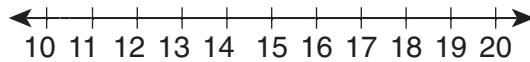
2. $\frac{5}{4}(x + 8) = 12$

3. $16 - 10x = 21 - 2x$

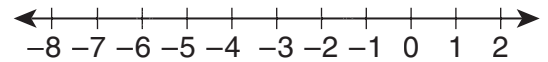
4. $2(3x + 6) - 4(x - 2) = 24$

Solve and graph.

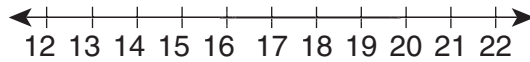
5. $36 \geq -9 + 3x$



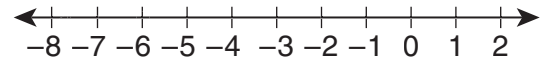
6. $1 - 3x < 19$



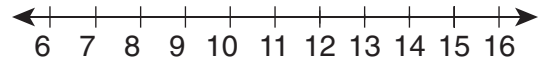
7. $2(6 + 3x) \leq 4(2x - 5)$



8. $7x - 2(5x + 3) \geq 12$



9. Joe has saved \$42 to buy a mountain bike that costs \$282. Joe gets paid \$20 for each lawn he mows. How many lawns must Joe mow to have enough money to buy the bike?



2-2 Proportional Reasoning

Solve each proportion.

10. $\frac{x}{6} = \frac{9}{2}$ _____

11. $\frac{4}{6} = \frac{2x}{9}$ _____

12. $\frac{4.8}{-x} = \frac{3.2}{3}$ _____

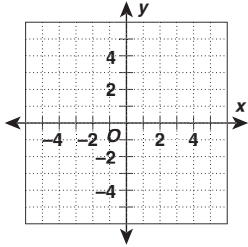
13. $\frac{2}{3} = \frac{3}{2x - 2}$ _____

14. A tree casts a 24-foot shadow at the same time that a 12-foot pole casts a 6-ft shadow. How tall is the tree? _____

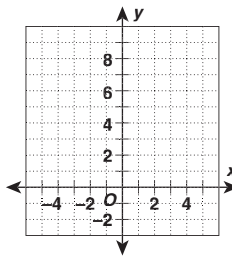
SECTION 2A **Ready to Go On? Quiz** continued

2-3 Graphing Linear Functions
Find the intercepts and graph each line.

15. $5x + 4y = 20$ _____

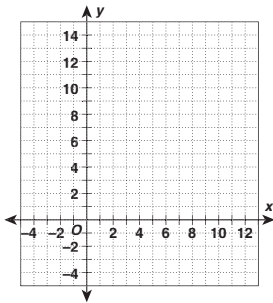


16. $6x - 2y = -18$ _____

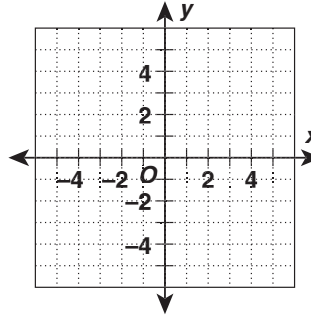


Write each function in slope-intercept form. Then graph the function.

17. $y - 6x = 12$ _____



18. $4x - 12 - 6y = 0$ _____



2-4 Writing Linear Functions

Write an equation in slope-intercept form for each line.

19. through (3, 11) and (5, 19) _____

20. slope $\frac{1}{3}$ and through (3, -5) _____

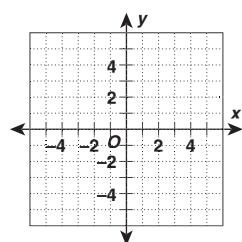
21. parallel to $y = \frac{5}{3}x - 2$ and through (-6, -1) _____

22. perpendicular to $4x + 3y = 9$ and through (-4, -1) _____

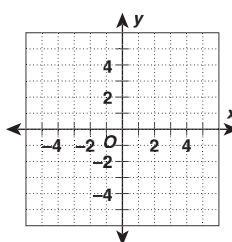
2-5 Linear Inequalities in Two Variables

Solve for y in each inequality. Then graph.

23. $y - 4 \leq -2$ _____



24. $7x - 4y > 10x + 8$ _____



SECTION
2B**Ready to Go On? Enrichment****Equations of Lines**

Determine the letter of the equation of a line from the table below that represents the same line as the given equation.

A. $y = -31\frac{1}{4} + 1\frac{1}{4}x$	E. $y - 2.2 = 6.5(x - 4.3)$	I. $y + 2.3 = -6x$
B. $y - (-3) = \frac{5}{9}(x - (-27))$	F. $y - \frac{2}{3} = 9\left(x - \frac{4}{3}\right)$	J. $y = -2x + 24$
C. $y = 2.5x + \frac{1}{18}$	G. $-y - 12 = -\frac{3}{8}x$	
D. $y - 0 = 4.5(x - 2.3)$	H. $y - (-1) = -4(x - (-1))$	

1. $y - 16 = -2(x - 4)$ _____

2. $y = \frac{27}{3}x - 11\frac{1}{3}$ _____

3. $y = 6.5x - 25.75$ _____

4. $y = 4.5x - 10.35$ _____

5. $y - \left(-\frac{1}{2}\right) = \frac{5}{2}\left(x - \left(-\frac{2}{9}\right)\right)$ _____

6. $y + 12 = \frac{5}{9}x$ _____

7. $y - \frac{1}{10} = -6\left(x - \frac{2}{5}\right)$ _____

8. $y = -(4x + 5)$ _____

9. $\frac{y - (-12)}{(x - 0)} = 0.375$ _____

10. $\frac{y - \frac{5}{4}}{(x - 22)} = \frac{15}{11}$ _____

SECTION 2B **Ready to Go On? Skills Intervention**
2-6 Transforming Linear Functions

Translating and Reflecting Linear Functions

Let $g(x)$ be the indicated transformation of $f(x)$. Write the rule for $g(x)$.

$f(x) = x + 1$; vertical translation 3 units up

Does a vertical translation change the input values or the output values? _____

What number is being added to each value? $g(x) = f(x) + \underline{\hspace{2cm}}$

Replace $f(x)$ with the function given. $g(x) = (x + \underline{\hspace{1cm}}) + \underline{\hspace{1cm}}$

Simplify the final function. $g(x) = x + \underline{\hspace{2cm}}$

Stretching and Compressing Linear Functions

Let $g(x)$ be the indicated transformation of $f(x)$. Write the rule for $g(x)$.

$f(x) = 5x$; vertical compression by a factor of $\frac{1}{2}$

How does a vertical compression change the graph of a function? _____

Does a vertical compression change the input values or the output values? _____

Multiply $f(x)$ by the factor of the compression. $g(x) = \underline{\hspace{1cm}} \cdot 5x$

Simplify the function. $g(x) = \underline{\hspace{2cm}}x$

Combining Transformations of Linear Functions

Let $g(x)$ be the indicated transformation(s) of $f(x)$. Write the rule for $g(x)$.

$f(x) = x - 8$; horizontal stretch by a factor of 4 followed by a horizontal translation to the right 2 units

What is the first transformation? _____

Do the input values or the output values change? _____

What is the function after the first transformation? $h(x) = f\left(\frac{1}{b}x\right) = \frac{x}{\square} - \underline{\hspace{1cm}}$

What is the second transformation? _____

How do you translate a function horizontally to the right? _____

$$h(x) = \frac{x}{4} - 2$$

Perform the second transformation to find $g(x)$. $g(x) = h(x) - 2$

$$g(x) = \frac{\square}{\square} - \underline{\hspace{1cm}} - 2$$

$$g(x) = \frac{x}{\square} - \underline{\hspace{1cm}}$$

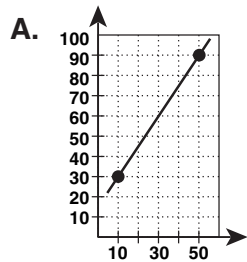
SECTION 2B **Ready to Go On? Skills Intervention**
2-7 Curve Fitting with Linear Models

Find these vocabulary words in Lesson 2-7 and the Multilingual Glossary.

Vocabulary			
regression	correlation	line of best fit	correlation coefficient

Finding the Slope of a Line

Find the slope of each line. Then write the equation that fits the data.



Does the line slant upward or downward? _____

Predict if the slope is positive or negative. _____

Select one point on the line and call it (x_1, y_1) . (10, ___)

Select another point on the line and call it (x_2, y_2) . (50, ___)

Substitute these ordered pairs into the slope formula and solve for m .

$$m = \frac{y_2 - y_1}{x_2 - x_1} = \frac{\square - \square}{\square - \square} = \frac{\square}{\square} = \frac{\square}{\square}$$

$y - y_1 = m(x - x_1)$ Use the point-slope form.

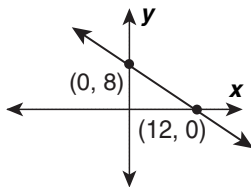
$y - \underline{\quad} = \underline{\quad}(x - \underline{\quad})$ Substitute the values for $y_1, x_1,$ and m .

$y - \underline{\quad} = \underline{\quad}x - \underline{\quad}$ Distribute.

$+ \underline{\quad} \quad + \underline{\quad}$ Add to isolate y .

$y = \underline{\quad}x + \underline{\quad}$ Simplify.

B.



Does the line slant upward or downward? _____

Predict if the slope is positive or negative. _____

Select one point on the line and call it (x_1, y_1) . (0, ___)

Select another point on the line and call it (x_2, y_2) . (12, ___)

Substitute these ordered pairs into the slope formula and solve for m .

$$m = \frac{y_2 - y_1}{x_2 - x_1} = \frac{\square - \square}{\square - \square} = \frac{\square}{\square} = \frac{\square}{\square}$$

$y - y_1 = m(x - x_1)$ Use the point-slope form.

$y - \underline{\quad} = \underline{\quad}(x - \underline{\quad})$ Substitute the values for $y_1, x_1,$ and m .

$y - \underline{\quad} = \underline{\quad}x - \underline{\quad}$ Distribute.

$+ \underline{\quad} \quad + \underline{\quad}$ Add to isolate y .

$y = \underline{\quad}x + \underline{\quad}$ Simplify.

SECTION 2B **Ready to Go On? Problem Solving Intervention**
2-7 Curve Fitting with Linear Models

A scatter plot is helpful in understanding the relationships between two variables.

A particular company has offices in the United States and in Italy. Job applicants must be able to read and speak both English and Italian. As part of the application process, prospective employees must take a test on their knowledge of Italian. The personnel office compared the number of years applicants studied Italian to their test scores. Make a scatter plot of the data, and then sketch a line of best fit and find its equation.

Years of Study	2	3	3	2	4	5	4	5
Test Scores	52	60	57	48	68	86	73	90

Understand the Problem

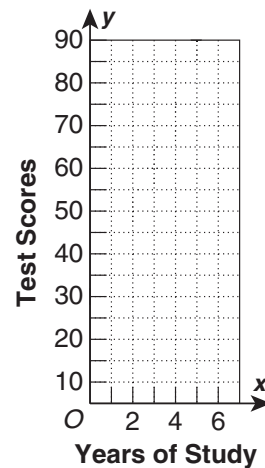
1. What two variables does the data describe? _____
2. What three things are you asked to do? _____

Make a Plan

3. Which variable should be plotted as the independent variable (input)? _____
4. Which variable should be plotted as the dependent variable (output)? _____

Solve

5. How many data points can you plot from the data? _____
Plot these points on the grid provided.
6. Is the correlation positive (upward) or negative (downward)? _____
7. Draw a line that splits the data evenly above and below the line. What are two points on the line?
(____, ____); (____, ____)
8. Use two points on the line, such as (2, 50) and (5, 88) to find the slope of the line.



$$m = \frac{y_2 - y_1}{x_2 - x_1} = \frac{88 - \square}{\square - 2} = \frac{\square}{\square} = \underline{\hspace{2cm}}$$

9. Use the point (2, 50) and the slope from Exercise 8 to write the equation of the line in point slope form. $y - y_1 = m(x - x_1) \rightarrow y - \underline{\hspace{1cm}} = \underline{\hspace{1cm}}(x - \underline{\hspace{1cm}})$

Look Back

10. Try related points in the equation from Exercise 9 to see if the answer is reasonable. For example, substitute 3 for x. Is the output value near the other points on the scatter plot? _____

SECTION 2B **Ready to Go On? Skills Intervention**
2-8 Solving Absolute-Value Equations and Inequalities

Find these vocabulary words in Lesson 2-8 and the Multilingual Glossary.

Vocabulary		
disjunction	conjunction	absolute value

Solving Absolute-Value Equations
 Solve each equation.

A. $|14 - 4x| = 22$
 $14 - 4x = \square$ or $14 - 4x = \square$ Rewrite the absolute value as a disjunction.
 $\frac{-14}{-4} = \frac{\square}{-4}$ $\frac{-14}{-4} = \frac{\square}{-4}$
 $-4x = \square$ $-4x = \square$
 $\frac{-4x}{-4} = \frac{\square}{-4}$ $\frac{-4x}{-4} = \frac{\square}{-4}$ Divide both sides of each equation by -4 .
 $x = \square$ $x = \square$

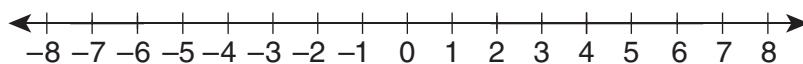
What are the possible values of x ? $x = \underline{\hspace{2cm}}$ or $x = \underline{\hspace{2cm}}$

B. $4|x| - 10 = 18$
 $4|x| - 10 = 18$
 $\frac{+ \square}{+ \square}$ Add $\underline{\hspace{1cm}}$ to both sides of the equation.
 $4|x| = \underline{\hspace{1cm}}$
 $\frac{4|x|}{4} = \frac{\square}{4}$ Divide each side of the equation by 4.
 $|x| = \square$ So, $x = \underline{\hspace{2cm}}$ or $x = \underline{\hspace{2cm}}$.

Solving Absolute-Value Equations with Disjunctions
 Solve the inequality $|3x + 6| \geq 12$. Then graph the solution.

$3x + 6 \geq \square$ or $3x + 6 \leq \square$ Rewrite the absolute value as a disjunction.
 $\frac{-6}{-6} = \frac{-6}{-6}$ $\frac{-6}{-6} = \frac{-6}{-6}$ Subtract 6 from both sides of each equation.
 $3x \geq \square$ $3x \leq \square$
 $\frac{3x}{3} \geq \frac{\square}{3}$ $\frac{3x}{3} \leq \frac{\square}{3}$ Divide both sides of each equation by 3.
 $x \geq \square$ $x \leq \square$ $\{x | x \leq \underline{\hspace{1cm}} \text{ or } x \geq \underline{\hspace{1cm}}\}$

Graph the solution. Should the circles be empty or solid? _____



If x is less than a number, draw an arrow to the left of the number. If x is greater than a number, draw an arrow to the right of the number.

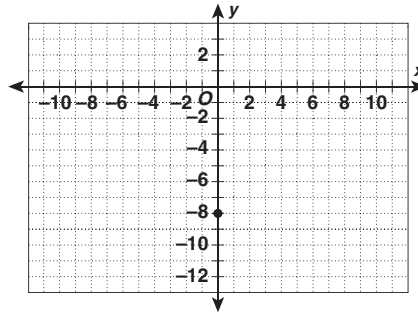
SECTION 2B **Ready to Go On? Skills Intervention**
2-9 Absolute-Value Functions

Find this vocabulary word in Lesson 2-9 and the Multilingual Glossary.

Vocabulary
absolute-value function

Translating Absolute-Value Equations

Translate $f(x) = |x|$ so that the vertex is at the given point. Then graph.



A. $(0, -8)$

Let $(0, -8)$ be (h, k) . In the absolute-value function below, substitute h and k with the given point.

$$g(x) = |x - h| + k$$

$$g(x) = |x - \underline{\quad}| + \underline{\quad} \quad \text{Substitute values for } h \text{ and } k.$$

$$g(x) = |x| - \underline{\quad} \quad \text{Simplify.}$$

Recall that the general forms for translations are:

Vertical: $g(x) = f(x) + k$ Horizontal: $g(x) = f(x + h)$

Does the new graph have a horizontal shift from $f(x) = |x|$? _____

If so, by how many units and in which direction? _____

Does the new graph have a vertical shift from $f(x) = |x|$? _____

If so, by how many units and in which direction? _____

Shift and draw the graph accordingly. Is the vertex of the new graph at $(0, -8)$? _____

B. $(1, 5)$

Let $(1, 5)$ be (h, k) . In the function below, substitute h and k with the given point.

$$g(x) = |x - h| + k = |x - \underline{\quad}| + \underline{\quad}$$

Does the new graph have a horizontal shift

from $f(x) = |x|$? _____

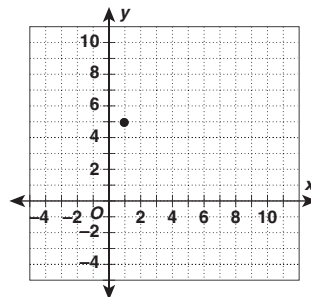
If so, by how many units and in which

direction? _____

Does the new graph have a vertical shift from $f(x) = |x|$? _____

If so, by how many units and in which direction? _____

Shift and draw the graph accordingly. Is the vertex of the new graph at $(1, 5)$? _____



SECTION 2B **Ready to Go On? Problem Solving Intervention**
2-9 Absolute-Value Functions

To exchange dollars for francs at the bank, the bank charges a commission equal to the exchange rate times the difference of dollars and francs. For every dollar exchanged, the customer will receive 1.20 francs. For every franc exchanged, the customer will receive 0.80 dollars. So if a customer exchanged \$100 for 120 francs, the difference of dollars and francs is 20.

- a. What function represents the commission the bank earns for exchanging dollars and francs?
- b. Graph the function.

Understand the Problem

1. Upon what two variables does the commission depend?

2. Can the difference of dollars and francs be negative? _____ Why?

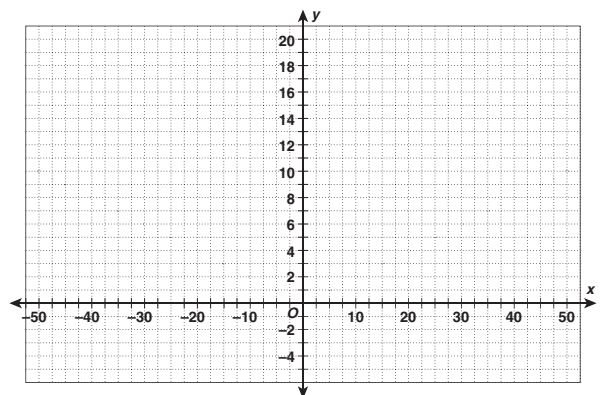
3. Can the commission be negative? _____ Why? _____

Make a Plan

4. How can you write the function so that the difference of dollars and francs always results in a positive commission? _____
5. If x is the difference of dollars and francs, and r is the exchange rate, what operation do you use to determine the commission? _____

Solve

6. Write an absolute value function to describe the commission. _____
7. Graph the function on the grid given that the exchange rate, r is 20% or 0.25.



Look Back

8. Check the graph. Is the commission always positive? _____
9. If you exchange \$100 for 120 francs and the exchange rate is 20% what commission does the bank earn? _____. Is this a reasonable amount of money? _____

SECTION
2B

Ready to Go On? Quiz

2-6 Transforming Linear Functions

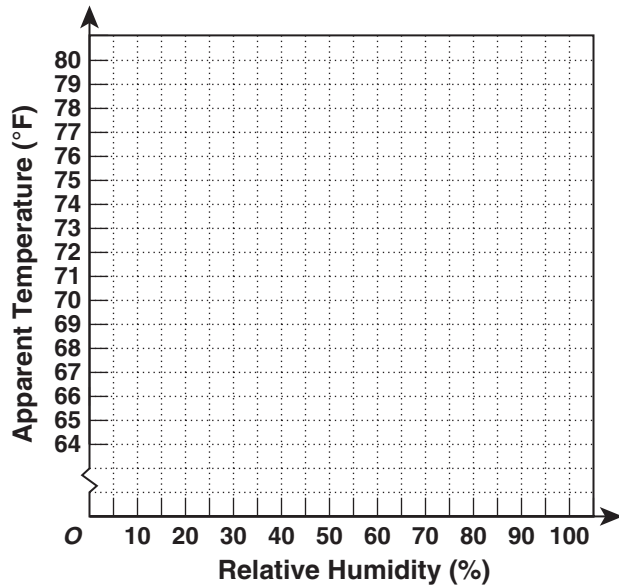
Let $g(x)$ be the indicated transformation(s) of $f(x)$. Write the rule for $g(x)$.

1. $f(x) = 3x$; vertical translation 3 units down _____
2. $f(x) = 4x$; vertical stretch by a factor of 4 _____
3. $f(x) = x + 2$; horizontal compression by a factor of $\frac{1}{4}$ followed by a horizontal translation left 8 units _____
4. $f(x) = 2x - 4$; horizontal translation 6 units right followed by a vertical compression by a factor of $\frac{1}{3}$ _____

2-7 Curve Fitting with Linear Models

5. A student has kept track of the relative humidity and the apparent room temperature. The results are shown in the table below.

Relative Humidity (%)	Apparent Room Temperature, (°F)
0	64
10	65
20	67
30	68
40	70
50	71
60	72
70	73
80	74
90	75
100	76



- a. Draw a scatter plot of the data using relative humidity as the independent variable.
- b. Use your graphing calculator to find the correlation coefficient and the equation of the line of best fit for the data. _____
 What does the slope of the best fit mean for this data? _____

- c. Use your equation to predict the apparent room temperature at a relative humidity of 45%. _____

SECTION 2B **Ready to Go On? Quiz** continued

2-8 Solving Absolute-Value Equations and Inequalities
Solve each equation.

6. $|10 - 5x| = 30$

7. $3|x| - 6 = 12$

8. $\frac{|8x - 2|}{-3} = 9$

9. $|6x - 3| = x + 2$

Solve each inequality. Then graph the solution.

10. $|4x + 8| > 16$ _____



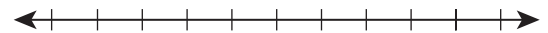
11. $\left| \frac{x - 1}{6} \right| \leq 3$ _____



12. $-2|8x - 5| - 6 = 12$ _____



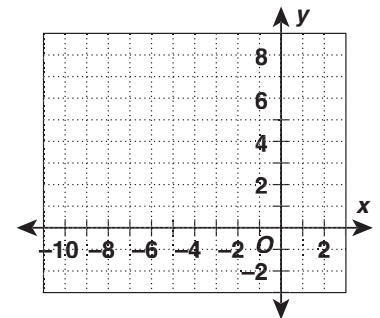
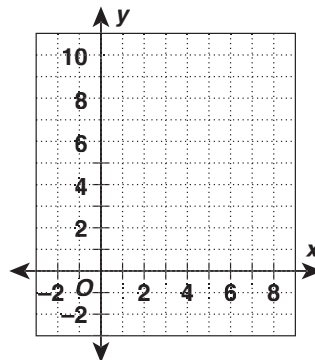
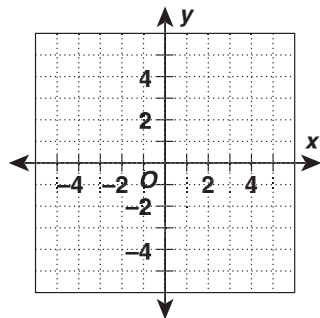
13. $|6x - 2| + 4 < 22$ _____



2-9 Absolute-Value Functions

Translate $f(x) = |x|$ so that the vertex is at the given point. Then graph.

14. $(0, -3)$ _____ 15. $(4, 6)$ _____ 16. $(-5, 0)$ _____



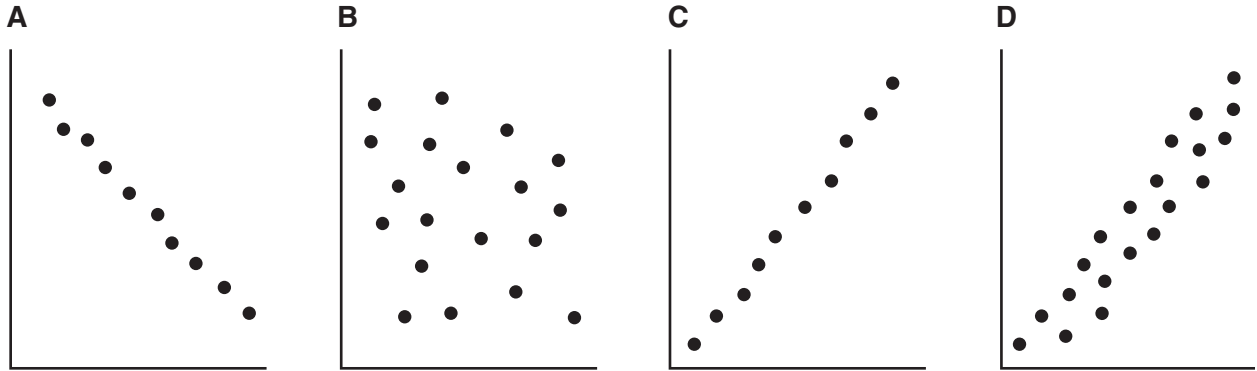
17. A cereal company fills every box with 48 ounces of cereal. The company allows each box of cereal to be within a tolerance above or below the 48 ounces. There are 12 boxes in each case packed for shipping. What function represents the maximum and minimum amounts of cereal in each case?

**SECTION
2B**

Ready to Go On? Enrichment

Scatter Plots

Match the correlation coefficient to the data it most likely describes.



1. $r = 0.96$ _____

2. $r = 0$ _____

3. $r = 0.55$ _____

4. $r = -0.97$ _____

Arrange the correlation coefficients in order from the weakest correlation to the strongest.

5. 0.72, 0.29, -0.15, -0.79 _____

6. -0.45, 0.22, -0.98, 0.56 _____

7. -0.001, -0.010, 0.011, -0.101 _____

8. -0.009, -0.909, -0.099, 0.999 _____

Identify each statement as *true* or *false*.

9. A scatter plot in which there is no relation between the data has a correlation coefficient close to 0.

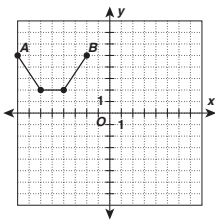
10. Some scatter plots have a correlation coefficient that is greater than 1, which indicates an even stronger relation between the data values.

11. A correlation coefficient close to 1 indicates a relation with a strong linear trend with a negative slope.

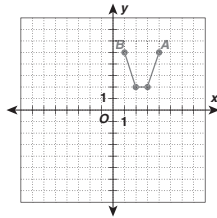
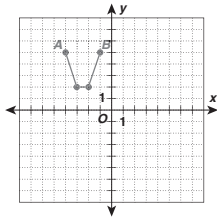
SECTION 1B Ready to Go On? Enrichment

Exploring Transformations

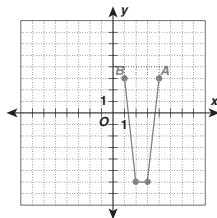
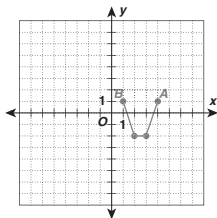
Transform $y = f(x)$ through the series of changes described. Draw each transformation on the grids provided.



- horizontal compression by a factor of $\frac{1}{2}$
- then a reflection across the y-axis



- then a translation down four units
- then a vertical stretch by a factor of 3



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SECTION 2A Ready to Go On? Skills Intervention

2-1 Solving Linear Equations and Inequalities

Find these vocabulary words in Lesson 2-1 and the Multilingual Glossary.

Vocabulary

equation	solution of an equation	linear equation in one variable
identity	contradiction	inequality

Solving Equations with Variables on Both Sides

Solve. $10 - 2x = 19 - 4x$

$10 - 2x = 19 - 4x$
 -10 -10
 $-2x = 9 - 4x$
 $+4x$ $+4x$

$2x = 9$
 $\frac{2x}{2} = \frac{9}{2}$
 $x = 4.5$

To get the constant on one side of the equation, subtract 10 from both sides of the equation.

To get the variable on one side of the equation, add 4x to both sides of the equation.

To isolate x, divide both sides of the equation by 2.

Solve for x.

Solving Inequalities

Solve and graph. $\frac{3}{2}(2x + 8) \leq 15$

$\frac{3}{2}(2x + 8) \leq 15$

$\frac{3}{2}(2x) + \frac{3}{2}(8) \leq 15$ Distribute $\frac{3}{2}$ to both terms in the "parentheses."

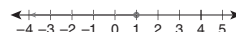
$3x + 12 \leq 15$ Multiply.
 $3x + 12 - 12 \leq 15 - 12$ Subtract 12 from both sides to isolate the variable.

$3x \leq 3$

$\frac{3x}{3} \leq \frac{3}{3}$ Divide both sides by 3 to isolate x. Do you need to reverse the inequality symbol? No
 $x \leq 1$ Solve for x.

Graph the solution.

A(n) solid circle should be used and the arrow should point to the left.



Test $x = 0$ in the original inequality.

Does your solution check? Yes

$\frac{3}{2}(2(0) + 8) \leq 15$
 $\frac{3}{2}(8) \leq 15$
 $12 \leq 15$

SECTION 2A Ready to Go On? Problem Solving Intervention

2-1 Solving Linear Equations and Inequalities

Solving a linear equation requires isolating the variable on one side of the equation by using the properties of equality.

Isabella is paid a salary of \$600 per month plus a commission of 2% of the sales price of each house she sells. Find the value of the houses Isabella must sell in one month to earn \$6600.

Understand the Problem

The value of the houses Isabella must sell to

- What are you trying to determine? earn \$6600.
- What two things make up Isabella's monthly income?
Monthly salary Commission
- What part of Isabella's monthly income is always the same, or constant? \$600/mo
- What part of Isabella's monthly income changes each month? Her commission

Make a Plan

- What percentage of each house sale does Isabella earn? 2%
- What is the decimal equivalent of 2%? $2\% =$ 0.02
- If Isabella sells *no* houses in one month, how much does she earn? \$600
- If Isabella sold a house for \$100,000, how much *commission* would she earn?
 2% of \$100,000 = $0.02(\$100,000) =$ \$ 2000
- If Isabella sold only one house for \$100,000 during the month, write a numerical expression to show much money she would earn for the month. $600 + 0.02(100,000)$
- How much money is Isabella hoping to earn? \$6600

Solve

- If h is the value of the houses Isabella sells, represent the situation with an equation.
 $600 + (0.02)h = 6600$
- Solve the equation for h .
 $600 + 0.02h = 6600$
 -600 -600
 $0.02h = 6000$
 $h = 300,000$
- Isabella must sell \$ 300,000 worth of houses in one month to earn \$6600.

Look Back

- Substitute your value for h into the original equation from Exercise 11.
 $600 + 0.02(300,000) = 6600$. Does the left side equal the right side? Yes

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SECTION 2A Ready to Go On? Skills Intervention

2-2 Proportional Reasoning

Find these vocabulary words in Lesson 2-2 and the Multilingual Glossary.

Vocabulary

ratio	proportion	rate	similar	indirect measurement
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Solving Proportions

Solve each proportion.

A. $\frac{x}{8} = \frac{9}{4}$

When a proportion contains a variable, use cross products to solve for the variable.

$\frac{x}{8} \times \frac{9}{4} = \frac{9}{4} \times \frac{x}{8}$
 $4x = 9(\frac{9}{4})$ Set the cross products equal.

$4x = \frac{72}{4}$ Multiply.

$\frac{4x}{4} = \frac{18}{4}$ Divide by 4 to solve for x.

$x = 18$ Solve for x.

B. $\frac{4}{7} = \frac{6x}{9}$

$\frac{4}{7} \times \frac{9}{6} = \frac{6x}{9} \times \frac{9}{6}$
 $4(\frac{3}{7}) = 6x(\frac{1}{1})$ Set the cross products equal.

$36 = 42x$ Multiply.

$\frac{36}{42} = \frac{42x}{42}$ Divide by 42 to solve for x.

$\frac{6}{7} = x$ Simplify the fraction.

C. $\frac{4.5}{-x} = \frac{1.8}{3}$

$4.5(3) = 1.8(-x)$ Set the cross products equal.

$13.5 = -1.8x$ Multiply. The product of a negative and a positive number is negative.

$\frac{13.5}{-1.8} = \frac{-1.8x}{-1.8}$ Divide by -1.8 to solve for x.

$-7.5 = x$ Solve for x.

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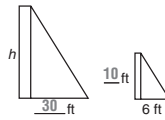
SECTION 2A **Ready to Go On? Problem Solving Intervention**
2-2 Proportional Reasoning

To measure an object that cannot be easily measured, use indirect measurement.

A cell tower casts a 30-ft shadow at the same time a 10-foot street sign casts a 6-ft shadow. How tall is the cell phone tower?

Understand the Problem

- Label the diagram with the given information.
- How long is the cell tower's shadow? 30 ft
- How tall is the street sign? 10 ft **Height of cell tower**
- What does h in the diagram represent? Height of cell tower



Make a Plan

- Since the triangles formed by the shadows are similar, use a proportion to find h , the height of the cell phone tower.
- The height of the cell phone tower corresponds to which part of the street sign? The height of the street sign
- The length of the cell phone shadow corresponds to which part of the street sign? The length of the street sign shadow

8. Complete the proportion: $\frac{\text{Height of cell phone tower}}{\text{Height of street sign}} = \frac{\text{Length of shadow of cell phone tower}}{\text{Length of shadow of street sign}}$

$$\frac{h}{10} = \frac{30}{6}$$

Solve

- Solve the proportion for h . $\frac{h}{10} = \frac{30}{6}$
 $6h = (10)(30)$ Set Cross Products equal.
 $6h = 300$ Multiply.
 $h = 50$
- How tall is the cell phone tower? 50 ft

Look Back

- Substitute the value for h from Exercise 9 into the proportion $\frac{h}{10} = \frac{30}{6}$. If the cross products are equal, the value for h is correct. $6(50) = 300$.

Does your answer check? Yes

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Holt Algebra 2

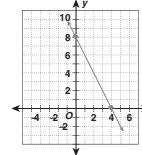
SECTION 2A **Ready to Go On? Skills Intervention**
2-3 Graphing Linear Functions

Find these vocabulary words in Lesson 2-3 and the Multilingual Glossary.

Vocabulary

linear function slope y-intercept x-intercept slope-intercept form

Graphing Lines Using the Intercepts
 Find the intercepts of $4x + 2y = 16$ and graph the line.



Find the x-intercept.

Substitute 0 for y . $4x + 2(0) = 16$

Multiply. $4x + 0 = 16$

Divide. $\frac{4x}{4} = \frac{16}{4}$

Solve for x . $x = 4$

The x-intercept is the point $(4, 0)$.

Find the y-intercept.

Substitute 0 for x . $4(0) + 2y = 16$

Multiply. $0 + 2y = 16$

Divide. $\frac{2y}{2} = \frac{16}{2}$

Solve for y . $y = 8$

The y-intercept is the point $(0, 8)$.

Plot the two points you found on the graph. Draw a straight line through the points.

Graph Functions in Slope-Intercept Form
 Write the function $2y + 2x = 6$ in slope-intercept form. Then graph the function.

$2y + 2x = 6$

$2y = 6 - 2x$

$\frac{2y}{2} = \frac{6 - 2x}{2}$

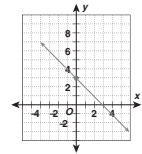
$y = 3 - x$

First, solve for y .

Subtract $2x$ from both sides.

Divide by 2 to isolate y .

Simplify.



What is the coefficient of x ? -1. This is the slope of the line.

What is the constant? 3. This is the y-intercept, or the y-coordinate when $x = 0$: $(0, 3)$. Plot this point on the graph.

Is the slope positive or negative? Negative

So, starting at the point of the y-intercept, move 1 unit(s) down and to the right one unit. Draw a straight line through the two points.

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Holt Algebra 2

SECTION 2A **Ready to Go On? Skills Intervention**
2-4 Writing Linear Functions

Find this vocabulary word in Lesson 2-4 and the Multilingual Glossary.

Vocabulary
 point-slope form

Writing Equations of Lines

Write the equation of the line through $(-1, 2)$ and $(2, 8)$ in slope-intercept form.

Let (x_1, y_1) be $(-1, 2)$ and (x_2, y_2) be $(2, 8)$.

Complete to find the slope of the line. $m = \frac{y_2 - y_1}{x_2 - x_1} = \frac{8 - 2}{2 - (-1)} = \frac{6}{3} = 2$

Although you can choose either point, substitute for x in the equation of a line, $y = mx + b$, the x -coordinate of $(2, 8)$ and for y , the y -coordinate of $(2, 8)$.

$y = mx + b$

$8 = m(2) + b$ Substitute values for x and y .

$8 = 2(2) + b$ Substitute the value of m , the slope of the line.

$8 = 4 + b$ Multiply.

$\frac{-4}{4} = \frac{-4}{4}$ Subtract 4 from both sides to solve for b .

$4 = b$ Solve for b .

Rewrite $y = mx + b$ using m and b .

$y = 2x + 4$

Writing Equations of Parallel and Perpendicular Lines

Write the equation of the line through $(-3, 7)$ and parallel to $y = \frac{2}{3}x + 1$ in slope-intercept form.

What do you know about the slopes of parallel lines? They have the same slope.

So, the slope of the line parallel to $y = \frac{2}{3}x + 1$ is equal to $\frac{2}{3}$.

Substitute for x in the equation of a line, $y = mx + b$, the x -coordinate of $(-3, 7)$ and for y , the y -coordinate of $(-3, 7)$.

$y = mx + b$

$7 = m(-3) + b$ Substitute values for x and y .

$7 = \frac{2}{3}(-3) + b$ Substitute the value of m , the slope of the line.

$7 = -2 + b$ Multiply.

$\frac{+2}{2} = \frac{+2}{2}$ Add 2 to both sides to solve for b .

$9 = b$ Solve for b .

Rewrite $y = mx + b$ using m and b .

$y = \frac{2}{3}x + 9$

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Holt Algebra 2

SECTION 2A **Ready to Go On? Skills Intervention**
2-5 Linear Inequalities in Two Variables

Find these vocabulary words in Lesson 2-5 and the Multilingual Glossary.

Vocabulary

linear inequality boundary line

Graphing Linear Inequalities
 Solve for y in $y - 2 \leq 4$. Then graph.

$y - 2 \leq 4$

$\frac{+2}{+2} = \frac{+2}{+2}$ Add 2 to both sides to isolate the variable.

$y \leq 6$ Solve for y .

What is the boundary line? $y = 6$

Is the boundary line part of the solution? Yes

Should the boundary line be solid or dashed? Solid

Draw the boundary line on the graph.

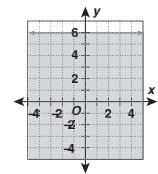
Should the region above or below the boundary line be shaded? Below

Choose a value for y , such as 0. Substitute this value into the inequality.

$y - 2 \leq 4$

$0 - 2 \leq 4$ Substitute 0 for y .

$-2 \leq 4$ Does the point satisfy the inequality? Yes



Graphing Linear Inequalities Using Intercepts
 Solve for y in $4x - 2y > 12$. Then graph.

Find the x-intercept by substituting 0 for y .

$4x - 2y = 12$

$4x - 2(0) = 12$

$4x - 0 = 12$

$x = \frac{12}{4} = 3$, so the x-intercept is $(3, 0)$.

Find the y-intercept by substituting 0 for x .

$4x - 2y = 12$

$4(0) - 2y = 12$

$0 - 2y = 12$

$y = \frac{12}{-2} = -6$, so the y-intercept is $(0, -6)$.

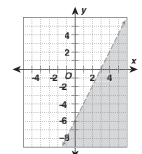
Use the x - and y -intercepts to draw the boundary line.

Should the boundary line be solid or dashed? Dashed

Substitute $(0, 0)$ in the inequality for x and y .

$4x - 2y > 12 \rightarrow 4(0) + 2(0) > 12$

If this point makes the statement true, shade the region containing the point. If not, shade the opposite region.



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Holt Algebra 2

SECTION 2A Ready to Go On? Problem Solving Intervention

2A 2-5 Linear Inequalities in Two Variables

When graphing a real-world application of an inequality graph only the part of the plane that includes realistic solutions.

Adam's school is holding its annual musical. Tickets to evening shows cost \$6.50 and tickets to afternoon shows cost \$4.00. The school needs to make at least \$260 to cover expenses. Write and graph an inequality for the number of each type of ticket that must be sold to make a profit.

Understand the Problem

1. What are the two prices of the tickets? \$6.50 \$4.00
2. How much money does the school need to make to cover expenses? \$260

Make a Plan

3. If x is the number of evening tickets, what do you need to multiply x by to find the amount the school makes by selling evening tickets? \$6.50
4. If y is the number of afternoon tickets, what do you need to multiply y by to find the amount the school makes by selling afternoon tickets? \$4.00

Solve

5. Complete the inequality to describe the situation.
 $6.5x + 4y \geq 260$

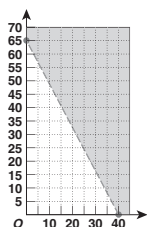
6. Find the intercepts of the boundary line.
y-intercept: $6.5(0) + 4y = 260$
 $0 + 4y = 260$
 $4y = 260$
 $y = \frac{260}{4}$
 $y = 65$
x-intercept: $6.5x + 4(0) = 260$
 $6.5x + 0 = 260$
 $6.5x = 260$
 $x = \frac{260}{6.5}$
 $x = 40$

The y-intercept is (0, 65). The x-intercept is (40, 0).

7. Plot the intercepts and draw a line through the two points.
8. Should you shade above or below this boundary line? Above

Look Back

9. Test a point, such as (0, 0) in the inequality from Exercise 5.
 $6.5x + 4y > 260$
 $6.5(0) + 4(0) > 260$ Substitute 0 for x and 0 for y .
 $0 > 260$ Is the inequality true? No Is the graph shaded correctly? Yes



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SECTION 2A Ready To Go On? Quiz

2-1 Solving Linear Equations and Inequalities

- Solve.**
1. $21 + x = 4x$
 $x = 7$
 2. $\frac{5}{4}(x + 8) = 12$
 $x = \frac{8}{5}$
 3. $16 - 10x = 21 - 2x$
 $x = -0.625$
 4. $2(3x + 6) - 4(x - 2) = 24$
 $x = 2$

Solve and graph.

5. $36 \geq -9 + 3x$
 $x \leq 15$
6. $1 - 3x < 19$
 $x > -6$
7. $2(6 + 3x) \leq 4(2x - 5)$
 $x \geq 16$
8. $7x - 2(5x + 3) \geq 12$
 $x \leq -6$
9. Joe has saved \$42 to buy a mountain bike that costs \$282. Joe gets paid \$20 for each lawn he mows. How many lawns must Joe mow to have enough money to buy the bike?
12 lawns

2-2 Proportional Reasoning

- Solve each proportion.**
10. $\frac{x}{6} = \frac{9}{2}$ $x = 27$
 11. $\frac{4}{6} = \frac{2x}{9}$ $x = 3$
 12. $\frac{4.8}{-x} = \frac{3.2}{3}$ $x = -4.5$
 13. $\frac{2}{3} = \frac{3}{2x - 2}$ $x = 3.25$
 14. A tree casts a 24-foot shadow at the same time that a 12-foot pole casts a 6-ft shadow. How tall is the tree? 48 feet

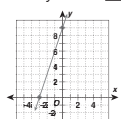
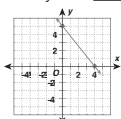
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SECTION 2A Ready to Go On? Quiz continued

2-3 Graphing Linear Functions

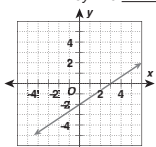
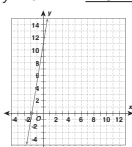
Find the intercepts and graph each line.

15. $5x + 4y = 20$ (0, 5) and (4, 0)
16. $6x - 2y = -18$ (0, 9) and (-3, 0)



Write each function in slope-intercept form. Then graph the function.

17. $y - 6x = 12$ $y = 6x + 12$
18. $4x - 12 - 6y = 0$ $y = \frac{4}{6}x - 2$



2-4 Writing Linear Functions

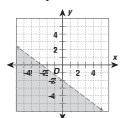
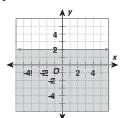
Write an equation in slope-intercept form for each line.

19. through (3, 11) and (5, 19) $y = 4x - 1$
20. slope $\frac{1}{3}$ and through (3, -5) $y = \frac{1}{3}x - 6$
21. parallel to $y = \frac{5}{3}x - 2$ and through (-6, -1) $y = \frac{5}{3}x + 9$
22. perpendicular to $4x + 3y = 9$ and through (-4, -1) $y = \frac{3}{4}x + 2$

2-5 Linear Inequalities in Two Variables

Solve for y in each inequality. Then graph.

23. $y - 4 \leq -2$ $y \leq 2$
24. $7x - 4y > 10x + 8$ $y < -\frac{3}{4}x - 2$



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SECTION 2B Ready to Go On? Enrichment

Equations of Lines

Determine the letter of the equation of a line from the table below that represents the same line as the given equation.

A. $y = -3\frac{1}{4} + 1\frac{1}{4}x$	E. $y - 2.2 = 6.5(x - 4.3)$	I. $y + 2.3 = -6x$
B. $y - (-3) = \frac{5}{9}(x - (-27))$	F. $y - \frac{2}{3} = 9(x - \frac{4}{3})$	J. $y = -2x + 24$
C. $y = 2.5x + \frac{1}{18}$	G. $-y - 12 = -\frac{3}{8}x$	
D. $y - 0 = 4.5(x - 2.3)$	H. $y - (-1) = -4(x - (-1))$	

1. $y - 16 = -2(x - 4)$ J
2. $y = \frac{27}{3}x - 11\frac{1}{3}$ F
3. $y = 6.5x - 25.75$ E
4. $y = 4.5x - 10.35$ D
5. $y - (-\frac{1}{2}) = \frac{5}{2}(x - (-\frac{2}{9}))$ C
6. $y + 12 = \frac{5}{9}x$ B
7. $y - \frac{1}{10} = -6(x - \frac{2}{5})$ I
8. $y = -(4x + 5)$ H
9. $\frac{y - (-12)}{(x - 0)} = 0.375$ G
10. $\frac{y - \frac{5}{4}}{(x - 22)} = \frac{15}{11}$ A

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SECTION 2B Ready to Go On? Skills Intervention

2B 2-6 Transforming Linear Functions

Translating and Reflecting Linear Functions

Let $g(x)$ be the indicated transformation of $f(x)$. Write the rule for $g(x)$.

$f(x) = x + 1$; vertical translation 3 units up

Does a vertical translation change the input values or the output values? Output

What number is being added to each value? $g(x) = f(x) + \underline{3}$

Replace $f(x)$ with the function given. $g(x) = (x + 1) + \underline{3}$

Simplify the final function. $g(x) = x + \underline{4}$

Stretching and Compressing Linear Functions

Let $g(x)$ be the indicated transformation of $f(x)$. Write the rule for $g(x)$.

$f(x) = 5x$; vertical compression by a factor of $\frac{1}{2}$

How does a vertical compression change the graph of a function? The line is less steep.

Does a vertical compression change the input values or the output values? Output

Multiply $f(x)$ by the factor of the compression. $g(x) = \frac{1}{2} \cdot 5x$

Simplify the function. $g(x) = \underline{\frac{5}{2}}x$

Combining Transformations of Linear Functions

Let $g(x)$ be the indicated transformation(s) of $f(x)$. Write the rule for $g(x)$.

$f(x) = x - 8$; horizontal stretch by a factor of 4 followed by a horizontal translation to the right 2 units

What is the first transformation? Horizontal stretch

Do the input values or the output values change? Input

What is the function after the first transformation? $h(x) = f(\frac{1}{4}x) = \frac{x}{4} - 2$

What is the second transformation? Horizontal translation

How do you translate a function horizontally to the right? Subtract from the input value.

$$h(x) = \frac{x}{4} - 2$$

Perform the second transformation to find $g(x)$. $g(x) = h(x) - 2$

$$g(x) = \frac{x}{4} - \underline{2} - 2$$

$$g(x) = \frac{x}{4} - \underline{4}$$

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SECTION 2B Ready to Go On? Skills Intervention

2B 2-7 Curve Fitting with Linear Models

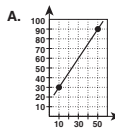
Find these vocabulary words in Lesson 2-7 and the Multilingual Glossary.

Vocabulary

regression correlation line of best fit correlation coefficient

Finding the Slope of a Line

Find the slope of each line. Then write the equation that fits the data.



Does the line slant upward or downward? Upward

Predict if the slope is positive or negative. Positive

Select one point on the line and call it (x_1, y_1) . $(10, \underline{30})$

Select another point on the line and call it (x_2, y_2) . $(50, \underline{90})$

Substitute these ordered pairs into the slope formula and solve for m .

$$m = \frac{y_2 - y_1}{x_2 - x_1} = \frac{90 - 30}{50 - 10} = \frac{60}{40} = \frac{3}{2}$$

$y - y_1 = m(x - x_1)$ Use the point-slope form.

$$y - 30 = \frac{3}{2}(x - 10)$$

Substitute the values for $y_1, x_1,$ and m .

$$y - 30 = \frac{3}{2}x - 15$$

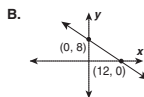
Distribute.

$$+ 30 \quad + 30$$

Add to isolate y .

$$y = \frac{3}{2}x + 15$$

Simplify.



Does the line slant upward or downward? Downward

Predict if the slope is positive or negative. Negative

Select one point on the line and call it (x_1, y_1) . $(0, \underline{8})$

Select another point on the line and call it (x_2, y_2) . $(12, \underline{0})$

Substitute these ordered pairs into the slope formula and solve for m .

$$m = \frac{y_2 - y_1}{x_2 - x_1} = \frac{0 - 8}{12 - 0} = \frac{-8}{12} = \frac{-2}{3}$$

$y - y_1 = m(x - x_1)$ Use the point-slope form.

$$y - 8 = \frac{-2}{3}(x - 0)$$

Substitute the values for $y_1, x_1,$ and m .

$$y - 8 = \frac{-2}{3}x - 0$$

Distribute.

$$+ 8 \quad + 8$$

Add to isolate y .

$$y = \frac{-2}{3}x + 8$$

Simplify.

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SECTION 2B Ready to Go On? Problem Solving Intervention

2B 2-7 Curve Fitting with Linear Models

A scatter plot is helpful in understanding the relationships between two variables.

A particular company has offices in the United States and in Italy. Job applicants must be able to read and speak both English and Italian. As part of the application process, prospective employees must take a test on their knowledge of Italian. The personnel office compared the number of years applicants studied Italian to their test scores. Make a scatter plot of the data, and then sketch a line of best fit and find its equation.

Years of Study	2	3	3	2	4	5	4	5
Test Scores	52	60	57	48	68	86	73	90

Understand the Problem

1. What two variables does the data describe? Years of study Score on test

2. What three things are you asked to do? Make a scatter plot. Find equation of the line. Sketch a line of best fit.

Make a Plan

3. Which variable should be plotted as the independent variable (input)? Years of study

4. Which variable should be plotted as the dependent variable (output)? Test scores

Solve

5. How many data points can you plot from the data? 8
Plot these points on the grid provided.

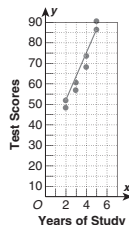
6. Is the correlation positive (upward) or negative (downward)? Positive

7. Draw a line that splits the data evenly above and below the line. What are two points on the line? Sample answer: (2, 50); (5, 88)

8. Use two points on the line, such as (2, 50) and (5, 88) to find the slope of the line.

$$m = \frac{y_2 - y_1}{x_2 - x_1} = \frac{88 - 50}{5 - 2} = \frac{38}{3} = \underline{12.67}$$

9. Use the point (2, 50) and the slope from Exercise 8 to write the equation of the line in point slope form. $y - y_1 = m(x - x_1) \rightarrow y - \underline{50} = \underline{12.67}(x - \underline{2})$



Look Back

10. Try related points in the equation from Exercise 9 to see if the answer is reasonable. For example, substitute 3 for x . Is the output value near the other points on the scatter plot? Yes

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SECTION 2B Ready to Go On? Skills Intervention

2B 2-8 Solving Absolute-Value Equations and Inequalities

Find these vocabulary words in Lesson 2-8 and the Multilingual Glossary.

Vocabulary

disjunction conjunction absolute value

Solving Absolute-Value Equations

Solve each equation.

A. $|14 - 4x| = 22$

$$14 - 4x = \underline{22} \text{ or } 14 - 4x = \underline{-22}$$

Rewrite the absolute value as a disjunction.

$$\underline{-14} - 4x = \underline{8} \quad \underline{-14} - 4x = \underline{-36}$$

$$\underline{-4}x = \underline{8} \quad \underline{-4}x = \underline{-36}$$

Divide both sides of each equation by -4 .

$$\underline{-2} \quad \underline{9}$$

What are the possible values of x ? $x = \underline{-2}$ or $x = \underline{9}$

B. $4|x| - 10 = 18$

$$4|x| - 10 = 18$$

Add 10 to both sides of the equation.

$$4|x| = \underline{28}$$

$$\frac{4|x|}{4} = \frac{\underline{28}}{4}$$

Divide each side of the equation by 4.

$$|x| = \underline{7}$$

So, $x = \underline{7}$ or $x = \underline{-7}$.

Solving Absolute-Value Equations with Disjunctions

Solve the inequality $|3x + 6| \geq 12$. Then graph the solution.

$$3x + 6 \geq \underline{12} \text{ or } 3x + 6 \leq \underline{-12}$$

Rewrite the absolute value as a disjunction.

$$\underline{-6} - 6 \geq \underline{-6} - 6 \quad \underline{-6} - 6 \leq \underline{-6} - 6$$

Subtract 6 from both sides of each equation.

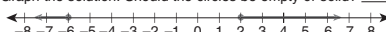
$$3x \geq \underline{6} \quad 3x \leq \underline{-18}$$

$$\frac{3x}{3} \geq \frac{\underline{6}}{3} \quad \frac{3x}{3} \leq \frac{\underline{-18}}{3}$$

Divide both sides of each equation by 3.

$$x \geq \underline{2} \quad x \leq \underline{-6} \quad \{x|x \leq \underline{-6} \text{ or } x \geq \underline{2}\}$$

Graph the solution. Should the circles be empty or solid? Solid



If x is less than a number, draw an arrow to the left of the number. If x is greater than a number, draw an arrow to the right of the number.

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SECTION 2B Ready to Go On? Skills Intervention

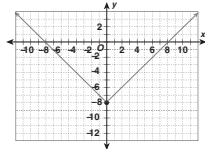
2B 2-9 Absolute-Value Functions

Find this vocabulary word in Lesson 2-9 and the Multilingual Glossary.

Vocabulary
absolute-value function

Translating Absolute-Value Equations

Translate $f(x) = |x|$ so that the vertex is at the given point. Then graph.



A. $(0, -8)$

Let $(0, -8)$ be (h, k) . In the absolute-value function below, substitute h and k with the given point.

$g(x) = |x - h| + k$

$g(x) = |x - 0| + -8$ Substitute values for h and k .

$g(x) = |x - 8$ Simplify.

Recall that the general forms for translations are:

Vertical: $g(x) = f(x) + k$

Horizontal: $g(x) = f(x + h)$

Does the new graph have a horizontal shift from $f(x) = |x|$? No

If so, by how many units and in which direction? N/A

Does the new graph have a vertical shift from $f(x) = |x|$? Yes

If so, by how many units and in which direction? 8 units down

Shift and draw the graph accordingly. Is the vertex of the new graph at $(0, -8)$? Yes

B. $(1, 5)$

Let $(1, 5)$ be (h, k) . In the function below, substitute h and k with the given point.

$g(x) = |x - h| + k = |x - 1| + 5$

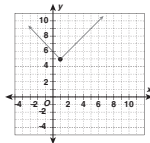
Does the new graph have a horizontal shift from $f(x) = |x|$? Yes

If so, by how many units and in which direction? 1 unit right

Does the new graph have a vertical shift from $f(x) = |x|$? Yes

If so, by how many units and in which direction? 5 units up

Shift and draw the graph accordingly. Is the vertex of the new graph at $(1, 5)$? Yes



SECTION 2B Ready to Go On? Problem Solving Intervention

2B 2-9 Absolute-Value Functions

To exchange dollars for francs at the bank, the bank charges a commission equal to the exchange rate times the difference of dollars and francs. For every dollar exchanged, the customer will receive 1.20 francs. For every franc exchanged, the customer will receive 0.80 dollars. So if a customer exchanged \$100 for 120 francs, the difference of dollars and francs is 20.

- What function represents the commission the bank earns for exchanging dollars and francs?
- Graph the function.

Understand the Problem

1. Upon what two variables does the commission depend?

The exchange rate The difference of dollars and francs

2. Can the difference of dollars and francs be negative? Yes Why?

You gain francs if you exchange dollars for francs or lose dollars if you trade francs for dollars.

3. Can the commission be negative? No Why? Commission is an amount of money.

Make a Plan

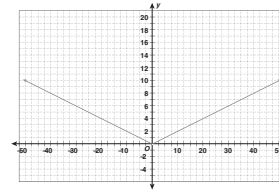
4. How can you write the function so that the difference of dollars and francs always results in a positive commission? Use an absolute-value function.

5. If x is the difference of dollars and francs, and r is the exchange rate, what operation do you use to determine the commission? Multiplication

Solve

6. Write an absolute value function to describe the commission. $f(x) = r|x|$

7. Graph the function on the grid given that the exchange rate, r is 20% or 0.25.



Look Back

8. Check the graph. Is the commission always positive? Yes

9. If you exchange \$100 for 120 francs and the exchange rate is 20% what commission does the bank earn? \$4. Is this a reasonable amount of money? Yes

SECTION 2B Ready to Go On? Quiz

2B

2-6 Transforming Linear Functions

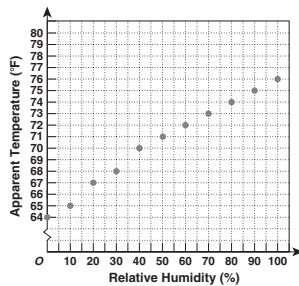
Let $g(x)$ be the indicated transformation(s) of $f(x)$. Write the rule for $g(x)$.

- $f(x) = 3x$; vertical translation 3 units down $g(x) = 3x - 3$
- $f(x) = 4x$; vertical stretch by a factor of 4 $g(x) = 16x$
- $f(x) = x + 2$; horizontal compression by a factor of $\frac{1}{4}$ followed by a horizontal translation left 8 units $g(x) = 4x + 10$
- $f(x) = 2x - 4$; horizontal translation 6 units right followed by a vertical compression by a factor of $\frac{1}{3}$ $g(x) = \frac{1}{3}(2x - 10)$

2-7 Curve Fitting with Linear Models

5. A student has kept track of the relative humidity and the apparent room temperature. The results are shown in the table below.

Relative Humidity (%)	Apparent Room Temperature, (°F)
0	64
10	65
20	67
30	68
40	70
50	71
60	72
70	73
80	74
90	75
100	76



- Draw a scatter plot of the data using relative humidity as the independent variable.
- Use your graphing calculator to find the correlation coefficient and the equation of the line of best fit for the data. $r = 0.994$ $y = 0.1209x + 64.4091$

What does the slope of the best fit mean for this data? Each additional percentage point increase in relative humidity results in an increase of 0.121°F in apparent room temperature.

- Use your equation to predict the apparent room temperature at a relative humidity of 45%. $\approx 70^\circ\text{F}$

SECTION 2B Ready to Go On? Quiz continued

2B

2-8 Solving Absolute-Value Equations and Inequalities

Solve each equation.

- $|10 - 5x| = 30$ $x = -4$ or $x = 8$
- $3|x| - 6 = 12$ $x = \pm 6$
- $\frac{|8x - 2|}{-3} = 9$ 0
- $|6x - 3| = x + 2$ $x = 1$ or $x = \frac{1}{7}$

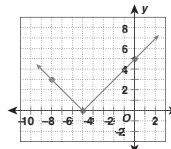
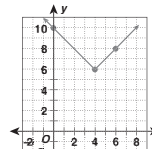
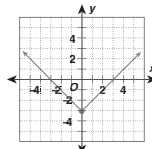
Solve each inequality. Then graph the solution.

- $|4x + 8| > 16$ $\{x | x < -6 \cup x > 2\}$
- $\frac{|x - 1|}{6} = 3$ $\{x | -17 \leq x \leq 19\}$
- $-2|8x - 5| - 6 = 12$ 0
- $|6x - 2| + 4 < 22$ $\{x | -\frac{8}{3} < x < \frac{10}{3}\}$

2-9 Absolute-Value Functions

Translate $f(x) = |x|$ so that the vertex is at the given point. Then graph.

- $(0, -3)$ $g(x) = |x| - 3$
- $(4, 6)$ $g(x) = |x - 4| + 6$
- $(-5, 0)$ $g(x) = |x + 5|$

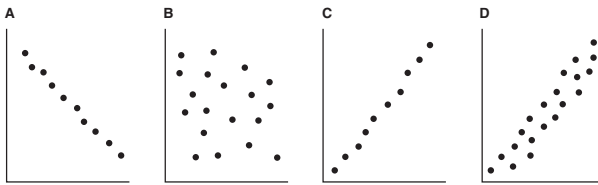


- A cereal company fills every box with 48 ounces of cereal. The company allows each box of cereal to be within a tolerance above or below the 48 ounces. There are 12 boxes in each case packed for shipping. What function represents the maximum and minimum amounts of cereal in each case?

$f(x) = |x - 12|(48)$

SECTION 2B Ready To Go On? Enrichment

Scatter Plots
Match the correlation coefficient to the data it most likely describes.



1. $r = 0.96$ C
 2. $r = 0$ B
 3. $r = 0.55$ D
 4. $r = -0.97$ A

Arrange the correlation coefficients in order from the weakest correlation to the strongest.

5. 0.72, 0.29, -0.15, -0.79 -0.15, 0.29, 0.72, -0.79
 6. -0.45, 0.22, -0.98, 0.56 0.22, -0.45, 0.56, -0.98
 7. -0.001, -0.010, 0.011, -0.101 0.001, -0.010, 0.011, -0.101
 8. -0.009, -0.909, -0.099, 0.999 -0.009, -0.099, -0.909, 0.999

Identify each statement as true or false.

9. A scatter plot in which there is no relation between the data has a correlation coefficient close to 0.
True
10. Some scatter plots have a correlation coefficient that is greater than 1, which indicates an even stronger relation between the data values.
False
11. A correlation coefficient close to 1 indicates a relation with a strong linear trend with a negative slope.
False

SECTION 3A Ready To Go On? Skills Intervention

3A-1 Using Graphs and Tables to Solve Linear Systems

Find these vocabulary words in Lesson 3-1 and the Multilingual Glossary.

Vocabulary

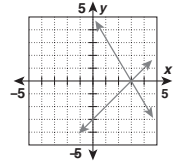
system of equations linear system consistent system
 inconsistent system independent system dependent system

Solving Linear Systems by Using Graphs and Tables

Use a graph and a table to solve $\begin{cases} x - y = 3 \\ 2x + y = 6 \end{cases}$.

Solve each equation for y . Subtract the x -term from both sides to isolate y .

$$\begin{aligned} x - y &= 3 & 2x + y &= 6 \\ -x & \quad -x & -2x & \quad -2x \\ -y &= -x + 3 & y &= 6 - 2x \\ y &= x - 3 & & \end{aligned}$$



Plot each line on the grid.

Complete the table of values for each equation.

x	y	x	y
0	-3	0	6
1	-2	1	4
2	-1	2	2
3	0	3	0
4	1	4	-2

What point do the lines have in common? (3, 0)

The solution to the system is (3, 0).

Classifying Linear Systems

Classify the system $\begin{cases} 3x - 2y = 4 \\ 6x = 4y + 8 \end{cases}$ and determine the number of solutions.

Solve each equation for y .

$$\begin{aligned} 3x - 2y &= 4 & 6x &= 4y + 8 \\ -2y &= 4 - 3x & 6x - 8 &= 4y \\ y &= -\frac{2}{2} + \frac{3}{2}x & \frac{3}{2}x - \frac{2}{2} &= y \end{aligned}$$

Do the equations have the same slope? Yes The same y -intercept? Yes

Are the systems dependent? Yes How many solutions are there? Infinite

SECTION 3A Ready To Go On? Skills Intervention

3A-2 Using Algebraic Methods to Solve Linear Systems

Find these vocabulary words in Lesson 3-2 and the Multilingual Glossary.

Vocabulary
 substitution elimination

Solving Linear Systems Using Substitution
 Use substitution to solve the system of equations $\begin{cases} y = x + 2 \\ 2x - y = 1 \end{cases}$.

- STEP 1** The first equation is already solved for which variable? y
 What does y equal in the first equation? $x + 2$
- STEP 2** Substitute the first equation from Step 1 into the second equation for y .
- STEP 3** Solve for x .

$$\begin{aligned} 2x - y &= 1 \\ 2x - (x + 2) &= 1 \\ 2x - x - 2 &= 1 \\ x - 2 &= 1 \\ +2 &+2 \\ x &= 3 \end{aligned}$$

STEP 4 Solve for the other variable.

$$\begin{aligned} x &= 3 \\ y &= x + 2 \\ y &= 3 + 2 \\ y &= 5 \end{aligned}$$

The solution to the system of equations is (3, 5).

Solving Linear Systems by Elimination
 Use elimination to solve the system of equations $\begin{cases} x + 2y = 10 \\ x + y = 6 \end{cases}$.

- STEP 1** To eliminate x , multiply the first equation by -1 .
 $-1(x + 2y) = 10(-1) \rightarrow -x - 2y = -10$
 $x + y = 6 \rightarrow x + y = 6$
- STEP 2** Combine the two equations using addition.
 $-x - 2y = -10$
 $x + y = 6$
 $-y = -4$
 $y = 4$
- STEP 3** Solve for y .
- STEP 4** Solve for the other variable.
 $x + y = 6$
 $x + 4 = 6$
 $x = 2$
 The solution to the system of equations is (2, 4).

SECTION 3A Ready To Go On? Skills Intervention

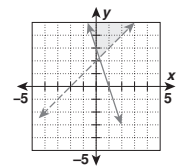
3A-3 Solving Systems of Linear Inequalities

Find this vocabulary word in Lesson 3-3 and the Multilingual Glossary.

Vocabulary
 system of linear inequalities

Graphing Systems of Inequalities
 Graph each system of inequalities.

- A.** $\begin{cases} y > x + 2 \\ y \geq -3x + 3 \end{cases}$
 Should the boundary line for $y > x + 2$ be solid or dashed? Dashed
 Draw the boundary line $y = x + 2$ on the graph.
 Should you shade above or below the boundary line?
Above



- Shade the region on the graph.
 Should the boundary line for $y \geq -3x + 3$ be solid or dashed? Solid
 Draw the boundary line $y = -3x + 3$ on the graph.
 Should you shade above or below the boundary line? Above
 Shade this region on the graph.
 What part of the graph shows the solution? Overlapping Region

Check the point (0, 5). Does this make the system true? Yes

- B.** $\begin{cases} y \leq -2x + 4 \\ x \geq -3 \\ y \geq 1 \end{cases}$
 Draw the boundary line for $y \leq -2x + 4$ on the graph.
 Shade the region below the boundary line.
 Draw the boundary line for $x \geq -3$ on the graph.
 Shade the region to the right of the boundary line.
 Draw the boundary line for $y \geq 1$ on the graph.
 Shade the region above the boundary line.
 Test the point (0, 2) from the overlapping region to check the solution.
 $y \leq -2x + 4 \rightarrow 2 \leq -2(0) + 4; 2 \leq 4$
 $x \geq -3 \rightarrow 0 \geq -3$
 $y \geq 1 \rightarrow 2 \geq 1$ ✓

