

Name \_\_\_\_\_ Date \_\_\_\_\_

**The Plane!**  
**Modeling Linear Situations****2****Vocabulary**

Define each term in your own words.

1. first differences
2. solution
3. intersection point

**Problem Set**

Identify the independent and dependent quantities in each problem situation. Then write a function to represent the problem situation.

1. Nathan is riding his scooter to school at a rate of 6 miles per hour.  
The distance Nathan travels depends on the time. Distance,  $D$ , is the dependent quantity and time,  $t$ , is the independent quantity.  
 $D(t) = 6t$
2. Sophia is walking to the mall at a rate of 3 miles per hour.
3. Mario is stuffing envelopes with invitations to the school's Spring Carnival. He stuffs 5 envelopes each minute.

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4. Shanise plays on the varsity soccer team. She averages 4 goals per game.
  
5. The football booster club sells hot chocolate during the varsity football games. Each cup of hot chocolate costs \$2.
  
6. The basketball booster club sells t-shirts at the varsity basketball games. Each t-shirt costs \$12.

Use each scenario to complete the table of values and calculate the unit rate of change.

7. Miguel is riding his bike to lacrosse practice at a rate of 7 miles per hour.

	Independent Quantity	Dependent Quantity
Quantity	Time	Distance
Units	hours	miles
Expression	$t$	$7t$
	0	0
	0.5	3.5
	1	7
	1.5	10.5
	2	14

$(0.5, 3.5)$  and  $(1, 7)$

$$\frac{7 - 3.5}{1 - 0.5} = \frac{3.5}{0.5}$$

$$= \frac{7}{1}$$

The unit rate of change is 7.

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8. Jada is walking to school at a rate of 2 miles per hour.

	Independent Quantity	Dependent Quantity
Quantity		
Units		
Expression		
	0.25	
	0.5	
	1	
	1.25	
	1.5	

**2**

9. Noah is stuffing envelopes with invitations to the school's Harvest Festival. He stuffs 4 envelopes each minute.

	Independent Quantity	Dependent Quantity
Quantity		
Units		
Expression		
	5	
	10	
	15	
	20	
	25	

**2**

10. Terrell plays on the varsity basketball team. He averages 12 points per game.

	Independent Quantity	Dependent Quantity
Quantity		
Units		
Expression		
	1	
	3	
	5	
	7	
	9	

11. The volleyball boosters sell bags of popcorn during the varsity matches to raise money for new uniforms. Each bag of popcorn costs \$3.

	Independent Quantity	Dependent Quantity
Quantity		
Units		
Expression		
	5	
	10	
	15	
	20	
	25	

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12. The football boosters sell hooded sweatshirts to raise money for new equipment. Each sweatshirt costs \$18.

	Independent Quantity	Dependent Quantity
Quantity		
Units		
Expression		
	5	
	10	
	20	
	30	
	40	

Identify the input value, the output value, and the rate of change for each function.

13. Belinda is making greeting cards. She makes 4 cards per hour. The function  $C(t) = 4t$  represents the total number of cards Belinda makes as a function of time.

The input value is  $t$ .

The output value is  $4t$ .

The rate of change is 4.

14. Owen is riding his bike to his friend's house at a rate of 6 miles per hour. The function  $D(t) = 6t$  represents the distance Owen rides as a function of time.



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15. Rochelle is shopping for earrings. Each pair of earrings costs \$15 dollars. The function  $C(e) = 15e$  represents the total cost of the earrings as a function of the number of pairs of earrings Rochelle buys.
16. Lavon is driving to visit a college campus. He is traveling 65 miles per hour. The function  $D(t) = 65t$  represents the total distance he travels as a function of time.
17. Kiana is selling coupon books to raise money for her school. Each coupon book cost \$35. The function  $M(b) = 35b$  represents the total amount of money raised as a function of the number of coupon books sold.
18. Cisco mows lawns in his neighborhood to earn money. He earns \$16 for each lawn. The function  $A(m) = 16m$  represents the total amount of money earned as a function of the number of lawns mowed.

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Solve each function for the given input value. The function  $A(t) = 7t$  represents the total amount of money in dollars Carmen earns babysitting as a function of time in hours.

19.  $A(3) = \underline{\hspace{2cm}}$

$$A(3) = 7(3)$$

$$= 21$$

Carmen earns \$21 when she babysits for 3 hours.

20.  $A(2) = \underline{\hspace{2cm}}$

21.  $A(5) = \underline{\hspace{2cm}}$

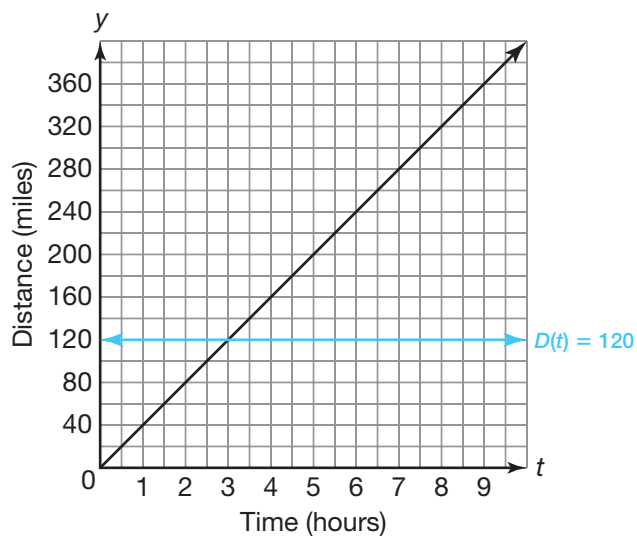
22.  $A(4.5) = \underline{\hspace{2cm}}$

23.  $A(3.5) = \underline{\hspace{2cm}}$

24.  $A(6) = \underline{\hspace{2cm}}$

Use the graph to determine the input value for each given output value. The function  $D(t) = 40t$  represents the total distance traveled in miles as a function of time in hours.

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25.  $D(t) = 120$   
 $t = 3$

26.  $D(t) = 320$

27.  $D(t) = 240$

28.  $D(t) = 160$

29.  $D(t) = 80$

30.  $D(t) = 400$



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## What Goes Up Must Come Down Analyzing Linear Functions

### Problem Set

Complete the table to represent each problem situation.

1. A hot air balloon cruising at 1000 feet begins to ascend. It ascends at a rate of 200 feet per minute.

	Independent Quantity	Dependent Quantity
Quantity	Time	Height
Units	minutes	feet
	0	1000
	2	1400
	4	1800
	6	2200
	8	2600
Expression	$t$	$200t + 1000$

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2. A bathtub contains 10 gallons of water. The faucet is turned on and fills the tub at a rate of 5.25 gallons per minute.

	Independent Quantity	Dependent Quantity
<b>Quantity</b>		
<b>Units</b>		
	0	
	1	
	3	
		36.25
		46.75
<b>Expression</b>		

3. A helicopter flying at 4125 feet begins its descent. It descends at a rate of 550 feet per minute.

	Independent Quantity	Dependent Quantity
<b>Quantity</b>		
<b>Units</b>		
	0	
	1	
	2	
		2475
		1925
<b>Expression</b>		

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4. A fish tank filled with 12 gallons of water is drained. The water drains at a rate of 1.5 gallons per minute.

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	Independent Quantity	Dependent Quantity
<b>Quantity</b>		
<b>Units</b>		
	0	
	1	
	3	
		4.5
		1.5
<b>Expression</b>		

5. A submarine is traveling at a depth of  $-300$  feet. It begins ascending at a rate of 28 feet per minute.

	Independent Quantity	Dependent Quantity
<b>Quantity</b>		
<b>Units</b>		
	0	
	2	
	4	
		$-132$
		$-76$
<b>Expression</b>		

2

6. A free-diver is diving from the surface of the water at a rate of 15 feet per minute.

	Independent Quantity	Dependent Quantity
Quantity		
Units		
	0	
	1	
	2	
		-45
		-60
Expression		

Identify the input value, the output value, the  $y$ -intercept, and the rate of change for each function.

7. A hot air balloon at 130 feet begins to ascend. It ascends at a rate of 160.5 feet per minute. The function  $f(t) = 160.5t + 130$  represents the height of the balloon as it ascends.  
 The input value is  $t$ , time in minutes. The output value is  $f(t)$ , height in feet.  
 The  $y$ -intercept is 130. The rate of change is 160.5.
8. A backyard pool contains 500 gallons of water. It is filled with additional water at a rate of 6 gallons per minute. The function  $f(t) = 6t + 500$  represents the volume of water in the pool as it is filled.
9. A submarine is diving from the surface of the water at a rate of 17 feet per minute. The function  $f(t) = -17t$  represents the depth of the submarine as it dives.

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**10.** A helicopter flying at 3505 feet begins its descent. It descends at a rate of 470 feet per minute. The function  $f(t) = -470t + 3505$  represents the height of the helicopter as it descends.

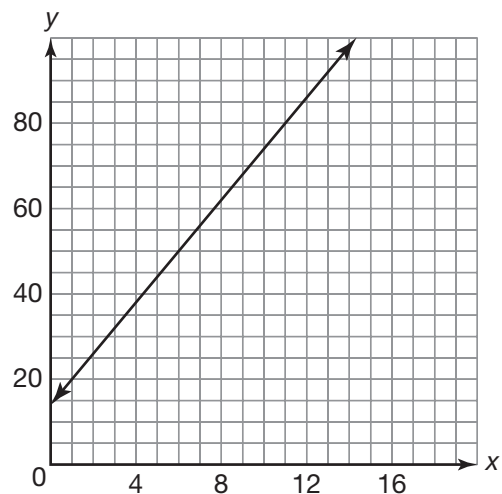
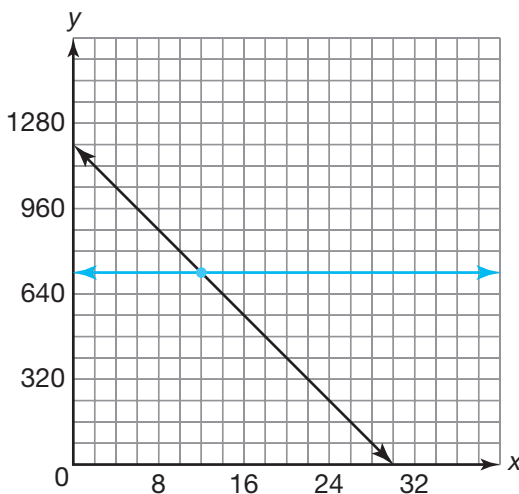
**11.** A bathtub contains 5 gallons of water. The faucet is turned on and water is added to the tub at a rate of 4.25 gallons per minute. The function  $f(t) = 4.25t + 5$  represents the volume of water in the bathtub as it is filled.

**12.** A free-diver is diving from the surface of the water at a rate of 8 feet per minute. The function  $f(t) = -8t$  represents the depth of the diver.

Sketch the line for the dependent value to estimate each intersection point.

**13.**  $f(x) = -40x + 1200$  when  $f(x) = 720$

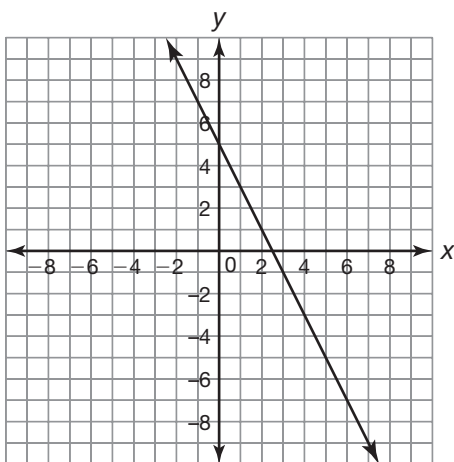
**14.**  $f(x) = 6x + 15$  when  $f(x) = 75$



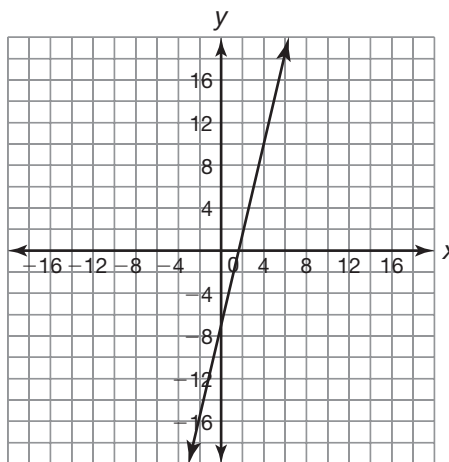
Answers will vary.  
 $f(x) = 720$  at  $x = 12$

2

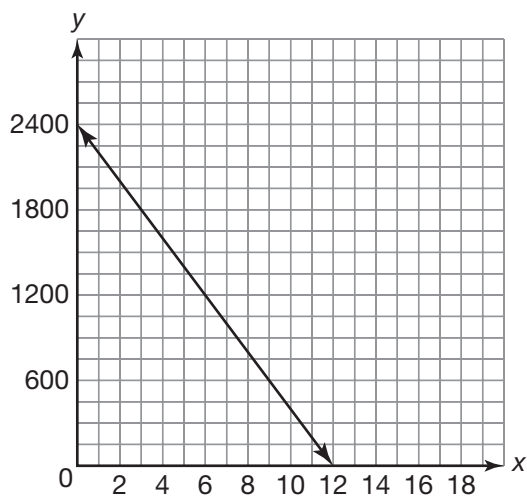
15.  $f(x) = -2x + 5$  when  $f(x) = -7$



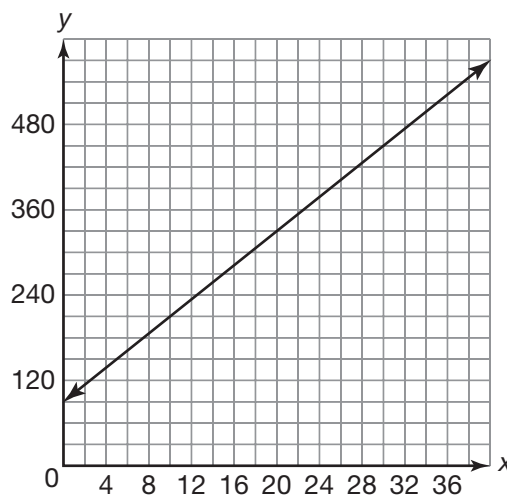
16.  $f(x) = 4x - 7$  when  $f(x) = 8$



17.  $f(x) = -200x + 2400$  when  $f(x) = 450$



18.  $f(x) = 12x + 90$  when  $f(x) = 420$



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Substitute and solve for  $x$  to determine the exact value of each intersection point.

**19.**  $f(x) = -40x + 1200$  when  $f(x) = 720$

$$f(x) = -40x + 1200$$

$$720 = -40x + 1200$$

$$-480 = -40x$$

$$12 = x$$

**20.**  $f(x) = 6x + 15$  when  $f(x) = 75$

**21.**  $f(x) = -2x + 5$  when  $f(x) = -7$

**22.**  $f(x) = 4x - 7$  when  $f(x) = 8$

**23.**  $f(x) = -200x + 2400$  when  $f(x) = 450$

**24.**  $f(x) = 12x + 90$  when  $f(x) = 420$





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**Scouting for Prizes!  
Modeling Linear Inequalities**

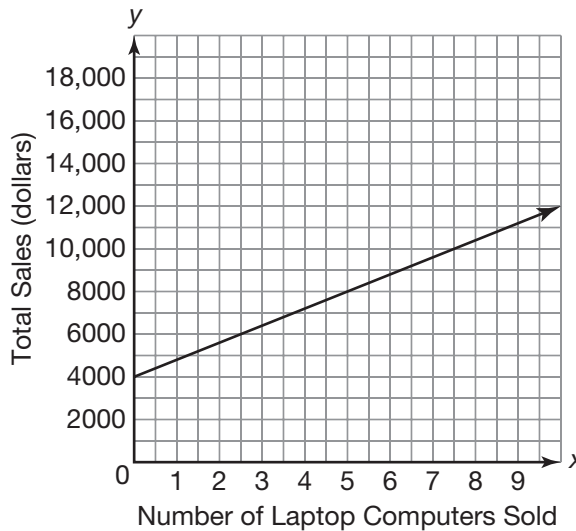
**Vocabulary**

Define the term in your own words.

1. solve an inequality

**Problem Set**

Carlos works at an electronics store selling computer equipment. He can earn a bonus if he sells \$10,000 worth of computer equipment this month. So far this month, he has sold \$4000 worth of computer equipment. He hopes to sell additional laptop computers for \$800 each to reach his goal. The function  $f(x) = 800x + 4000$  represents Carlos’s total sales as a function of the number of laptop computers he sells.



Use the graph to write an equation or inequality to determine the number of laptop computers Carlos would need to sell to earn each amount.

- 1. at least \$10,000
- 2. less than \$7000

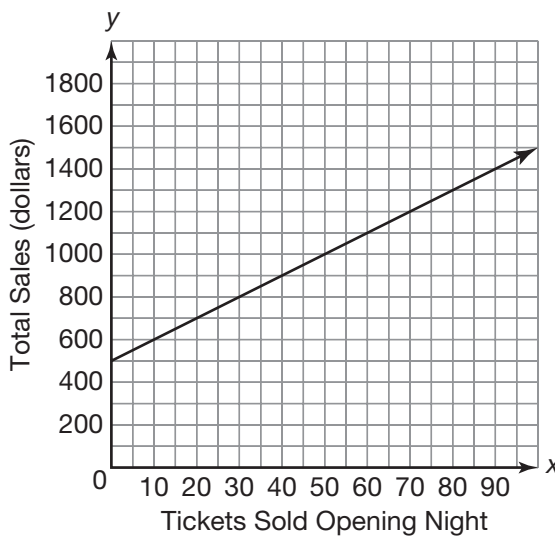
Carlos would need to sell at least 8 laptop computers.

$$x \geq 8$$

- 3. less than \$6000
- 4. at least \$9000

- 5. more than \$12,000
- 6. exactly \$8000

Elena works at the ticket booth of a local playhouse. On the opening night of the play, tickets are \$10 each. The playhouse has already sold \$500 worth of tickets during a presale. The function  $f(x) = 10x + 500$  represents the total sales as a function of tickets sold on opening night.

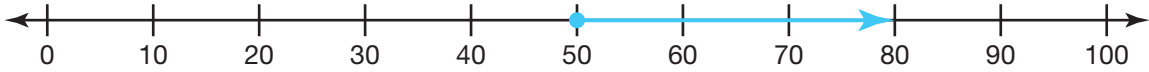


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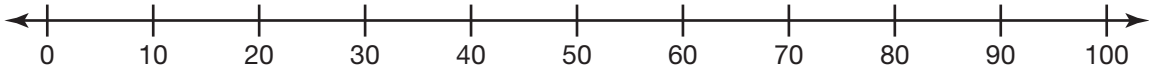
Use the graph of the function to answer each question. Graph each solution on the number line.

7. How many tickets must Elena sell in order to make at least \$1000?

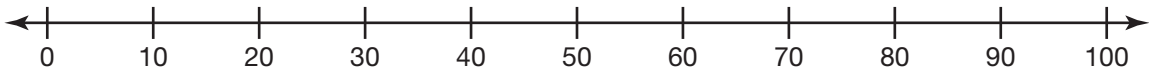
Elena must sell at least 50 tickets.  $x \geq 50$



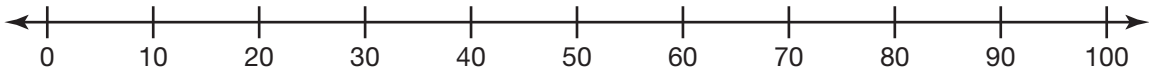
8. How many tickets must Elena sell in order to make less than \$800?



9. How many tickets must Elena sell in order to make at least \$1200?



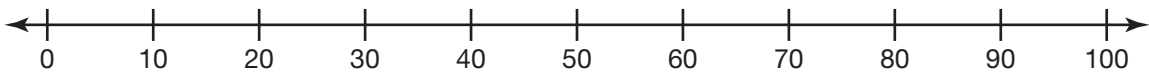
10. How many tickets must Elena sell in order to make exactly \$1400?



11. How many tickets must Elena sell in order to make less than \$600?



12. How many tickets must Elena sell in order to make exactly \$900?



**2**

Leon plays on the varsity basketball team. So far this season he has scored a total of 52 points. He scores an average of 13 points per game. The function  $f(x) = 13x + 52$  represents the total number of points Leon will score this season. Write and solve an inequality to answer each question.

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13. How many more games must Leon play in order to score at least 117 points?

$$f(x) = 13x + 52$$

$$117 \leq 13x + 52$$

$$65 \leq 13x$$

$$5 \leq x$$

Leon must play in 5 or more games to score at least 117 points.

14. How many more games must Leon play in order to score fewer than 182 points?

15. How many more games must Leon play in order to score more than 143 points?

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16. How many more games must Leon play in order to score at least 100 points?

2

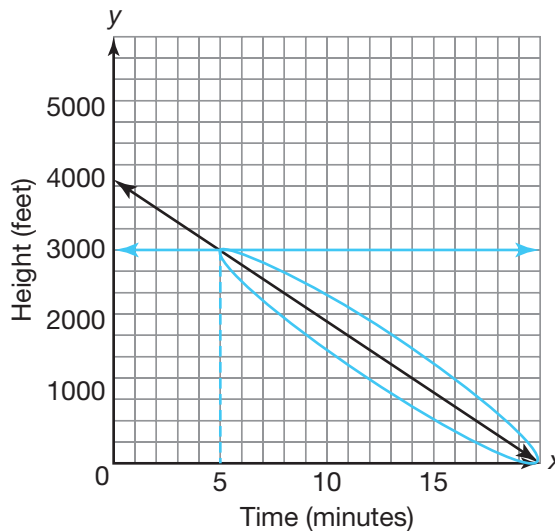
17. How many more games must Leon play in order to score fewer than 85 points?

18. How many more games must Leon play in order to score more than 200 points?

2

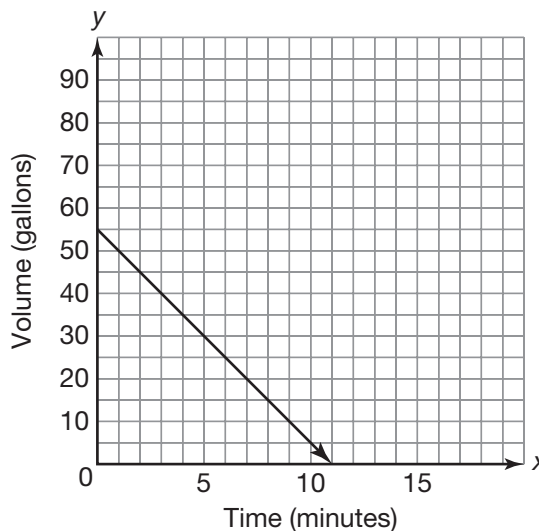
Draw an oval on the graph to represent the solution to each question. Write the corresponding inequality statement.

19. A hot air balloon at 4000 feet begins its descent. It descends at a rate of 200 feet per minute. The function  $f(x) = -200x + 4000$  represents the height of the balloon as it descends. How many minutes have passed if the balloon is below 3000 feet?



More than 5 minutes have passed if the balloon is below 3000 feet.  
 $x > 5$

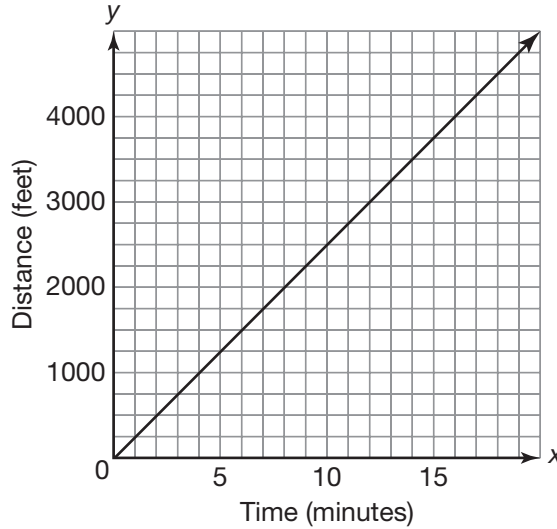
20. A bathtub filled with 55 gallons of water is drained. The water drains at a rate of 5 gallons per minute. The function  $f(x) = -5x + 55$  represents the volume of water in the tub as it drains. How many minutes have passed if the tub still has more than 20 gallons of water remaining in it?



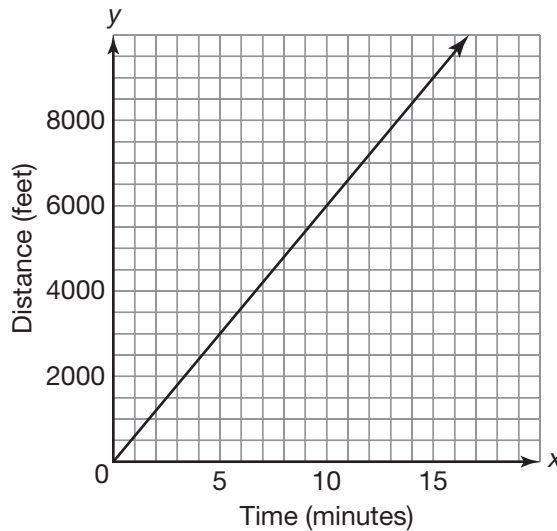
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21. Lea is walking to school at a rate of 250 feet per minute. Her school is 5000 feet from her home. The function  $f(x) = 250x$  represents the distance Lea walks. How many minutes have passed if Lea still has more than 2000 feet to walk?

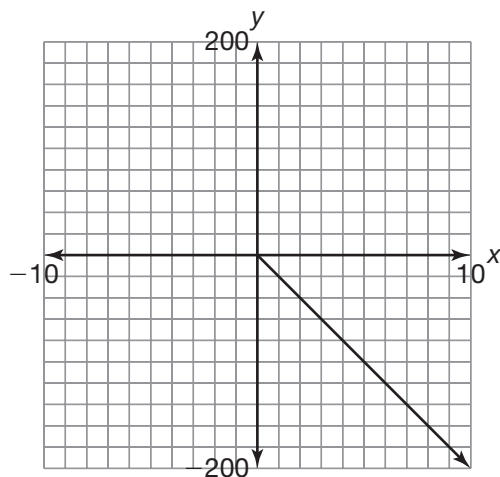


22. Franco is riding his bike to school at a rate of 600 feet per minute. His school is 9000 feet from his home. The function  $f(x) = 600x$  represents the distance Franco rides. How many minutes have passed if Franco has less than 3000 feet left to ride?

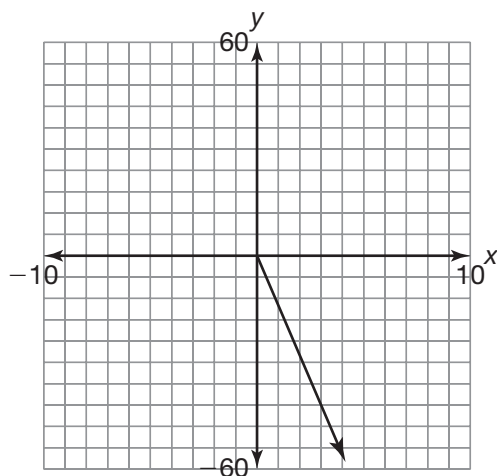


2

23. A submarine is diving from the surface of the water at a rate of 20 feet per minute. The function  $f(x) = -20x$  represents the depth of the submarine as it dives. How many minutes have passed if the submarine is at least 160 feet below the surface?



24. A scuba diver is diving from the surface of the water at a rate of 14 feet per minute. The function  $f(x) = -14x$  represents the depth of the diver as he dives. How many minutes have passed if the diver is less than 42 feet below the surface?





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**We're Shipping Out!**  
**Solving and Graphing Compound Inequalities**

**Vocabulary**

Match each definition to its corresponding term.

- |  |   |
|--|---|
| <ul style="list-style-type: none"> <li>1. compound inequality</li> <li>2. solution of a compound inequality</li> <li>3. conjunction</li> <li>4. disjunction</li> </ul> | <ul style="list-style-type: none"> <li>a. a solution of a compound inequality in the form <math>a &lt; x &lt; b</math>, where <math>a</math> and <math>b</math> are any real numbers</li> <li>b. an inequality that is formed by the union, "or," or the intersection, "and," of two simple inequalities</li> <li>c. the part or parts of the solutions that satisfy both of the inequalities</li> <li>d. a solution of a compound inequality in the form <math>x &lt; a</math> or <math>x &gt; b</math>, where <math>a</math> and <math>b</math> are any real numbers</li> </ul> |
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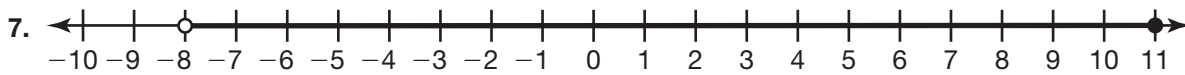
**Problem Set**

Write each compound inequality in compact form.

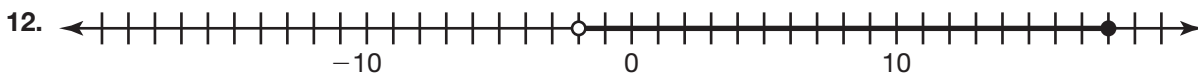
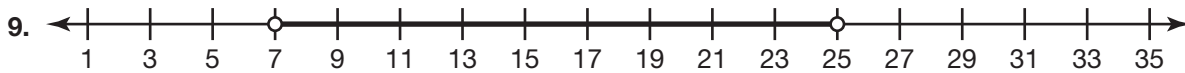
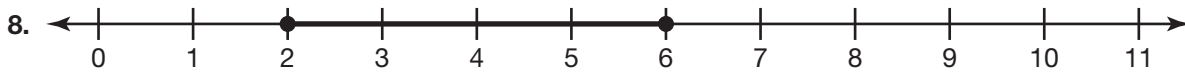
- 1. All numbers less than or equal to 22 and greater than  $-4$   
 $22 \geq x > -4$
- 2. All numbers less than 55 and greater than 45
- 3. All numbers greater than or equal to 0 and less than or equal to 6
- 4. All numbers greater than 10 and less than 1000
- 5. All numbers less than or equal to 87 and greater than or equal to 83
- 6. All numbers greater than  $-1$  and less than or equal to 39

2

Write an inequality for each graph.



$-8 < x \leq 11$

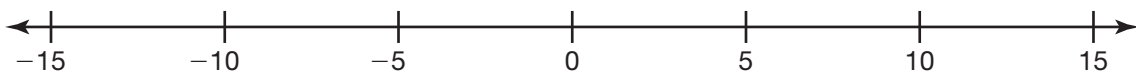


Graph each inequality.

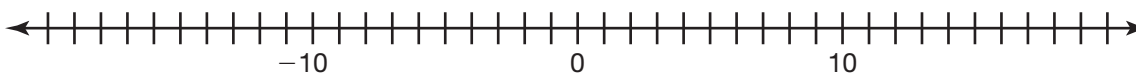
13.  $45 < x < 75$



14.  $-5 < x < 5$

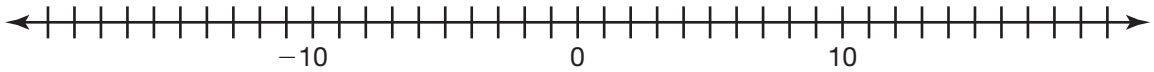


15.  $-13 \leq x \leq 5$

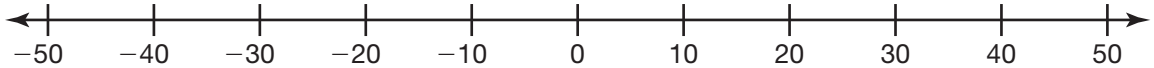


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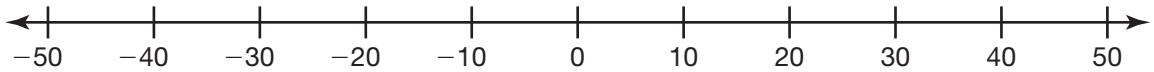
16.  $-6 \leq x < 19$



17.  $-35 \leq x \leq 50$



18.  $-5 < x \leq 45$



Write a compound inequality for each situation.

19. The flowers in the garden are 6 inches or taller *or* shorter than 3 inches.

$x \geq 6$  or  $x < 3$

20. People with a driver's license are at least 16 years old *and* no older than 85 years old.

21. Kyle's car gets more than 31 miles per gallon on the highway *or* 26 miles or less per gallon in the city.

22. The number of houses that will be built in the new neighborhood must be at least 14 and no more than 28.

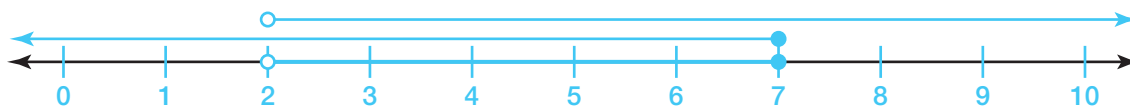
23. At the High and Low Store, they sell high-end items that sell for over \$1000 and low-end items that sell for less than \$10.

24. The heights of the twenty tallest buildings in New York City range from 229 meters to 381 meters.

Represent the solution to each part of the compound inequality on the number line. Then write the final solution that is represented by each graph.

2

25.  $x > 2$  and  $x \leq 7$



$2 < x \leq 7$

26.  $x > 10$  or  $x > 6$



27.  $x \geq 5$  or  $x < 3$



28.  $x > 4$  and  $x < 3$



29.  $x \leq -1$  or  $x > 0$



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30.  $8 > x \geq -8$



31.  $x \leq 9$  and  $x \geq 2$



32.  $x > -11$  or  $x \leq -11$



Solve each compound inequality. Then graph and describe the solution.

33.  $-3 < x + 7 \leq 17$

$-3 < x + 7 \leq 17$

$-3 - 7 < x + 7 - 7 \leq 17 - 7$

$-10 < x \leq 10$



**Solution:**  $-10 < x \leq 10$

2

34.  $4 \leq 2x + 2 < 12$



35.  $x + 5 > 14$  or  $3x < 9$



36.  $-5x + 1 \geq 16$  or  $x - 6 \leq -8$



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37.  $28 \leq \frac{7}{8}x < 42$

**2**

38.  $-2x + 5 \leq 9$  or  $-x - 13 > -31$







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**Play Ball!**  
**Absolute Value Equations and Inequalities**

**Vocabulary**

Define each term in your own words.

1. opposites
  
2. absolute value

Give an example of each term.

3. linear absolute value equation
  
4. linear absolute value inequality

Match each equivalent compound inequality to its corresponding absolute value inequality.

- |                      |  |
|----------------------|--|
| 5. $ ax + b  < c$    | a. $-c < ax + b < c$                   |
| 6. $ ax + b  \leq c$ | b. $ax + b < -c$ or $ax + b > c$       |
| 7. $ ax + b  > c$    | c. $-c \leq ax + b \leq c$             |
| 8. $ ax + b  \geq c$ | d. $ax + b \leq -c$ or $ax + b \geq c$ |

**Problem Set**

Evaluate each absolute value.

- |                       |              |                      |
|-----------------------|--------------|----------------------|
| 1. $ 3  = 3$          | 2. $ -3  =$  | 3. $ \frac{1}{4}  =$ |
| 4. $ \frac{-1}{4}  =$ | 5. $ 3.7  =$ | 6. $ -3.7  =$        |

Determine the number of solutions for each equation. Then calculate the solution.

7.  $x = -9$

There is only one solution.

$x = -9$

8.  $|x| = -6$

9.  $|x| = 4$

10.  $|-x| = -8$

11.  $|x| = 0$

12.  $|-x| = 15$

Solve each linear absolute value equation.

13.  $|x + 9| = 2$

$(x + 9) = 2$

$x + 9 - 9 = 2 - 9$

$x = -7$

$-(x + 9) = 2$

$x + 9 = -2$

$x + 9 - 9 = -2 - 9$

$x = -11$

14.  $|x + 4| = 10$

15.  $|x - 12| = 5$

16.  $|2x - 6| = 18$

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17.  $|3x + 1| = -9$

18.  $|5x + 1| = 14$

Solve each linear absolute value equation.

19.  $|x| - 8 = 25$

$|x| - 8 = 25$

$|x| - 8 + 8 = 25 + 8$

$|x| = 33$

$x = 33$

$-(x) = 33$

$x = -33$

20.  $|x + 3| - 7 = 40$

21.  $2|x - 6| = 48$

2

22.  $3|x + 8| = 36$

23.  $5|x| + 4 = 79$

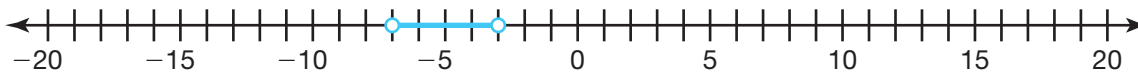
24.  $2|x| - 5 = 11$

Solve each linear absolute value inequality. Graph the solution on the number line.

25.  $|x + 5| < 2$

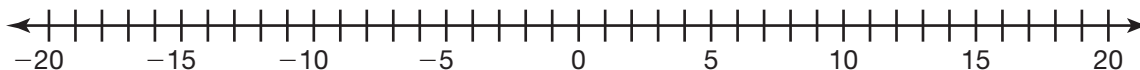
$$\begin{aligned} (x + 5) &< 2 \\ x + 5 - 5 &< 2 - 5 \\ x &< -3 \end{aligned}$$

$$\begin{aligned} -(x + 5) &< 2 \\ x + 5 &> -2 \\ x + 5 - 5 &> -2 - 5 \\ x &> -7 \end{aligned}$$

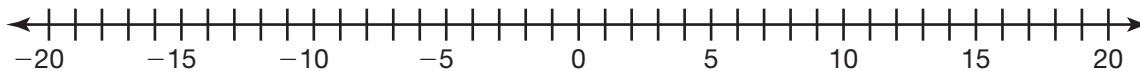


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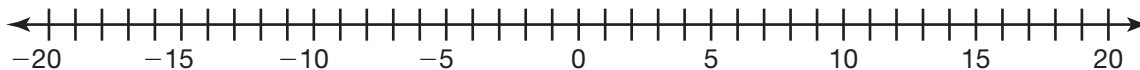
26.  $|x - 3| \leq 6$



27.  $2|x - 1| < 14$

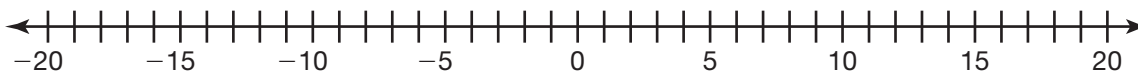


28.  $3|x + 4| \geq 9$

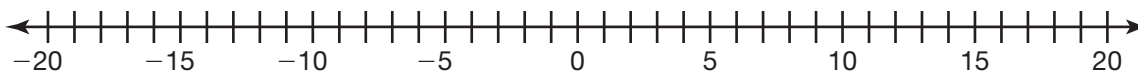


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29.  $2|x - 1| - 8 \leq 10$



30.  $3|x + 2| + 5 \geq 23$

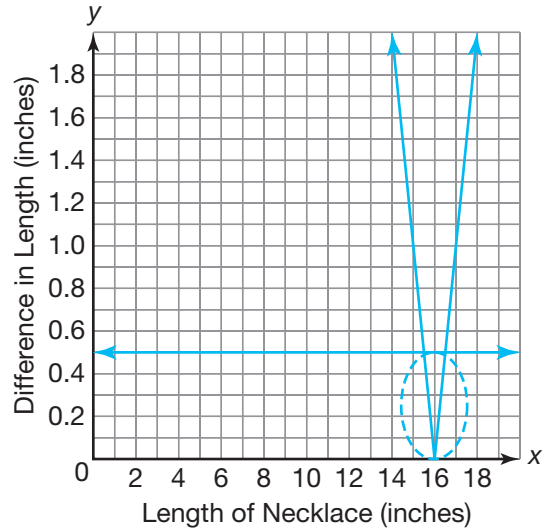


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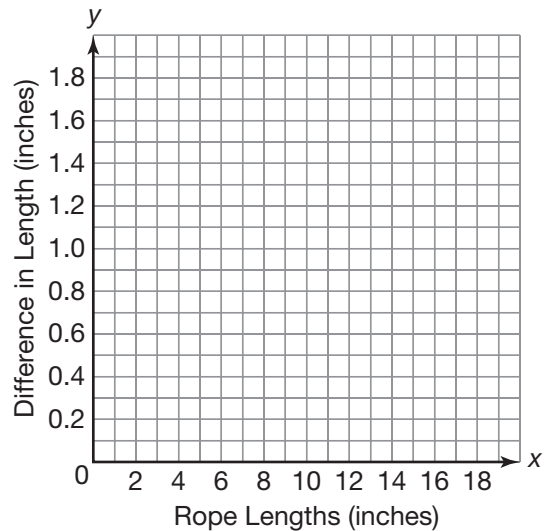
Graph the function that represents each problem situation. Draw an oval on the graph to represent the answer.

31. A jewelry company is making 16-inch bead necklaces. The specifications allow for a difference of 0.5 inch. The function  $f(x) = |x - 16|$  represents the difference between the necklaces manufactured and the specifications. Graph the function. What necklace lengths meet the specifications?

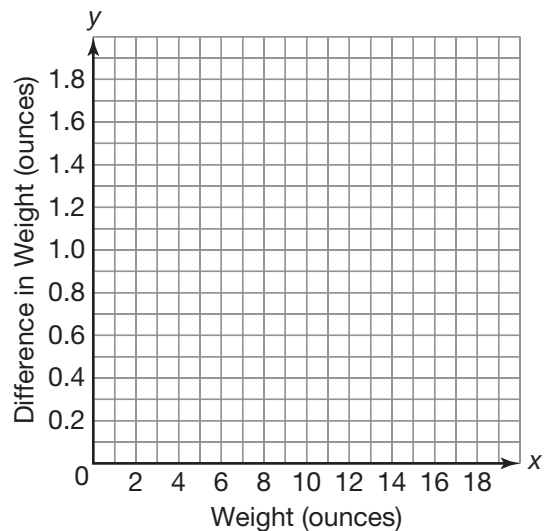
The necklaces can be between 15.5 and 16.5 inches long to meet the specifications.



32. Julian is cutting lengths of rope for a class project. Each rope length should be 10 inches long. The specifications allow for a difference of 1 inch. The function  $f(x) = |x - 10|$  represents the difference between the rope lengths cut and the specifications. Graph the function. What rope lengths meet the specifications?

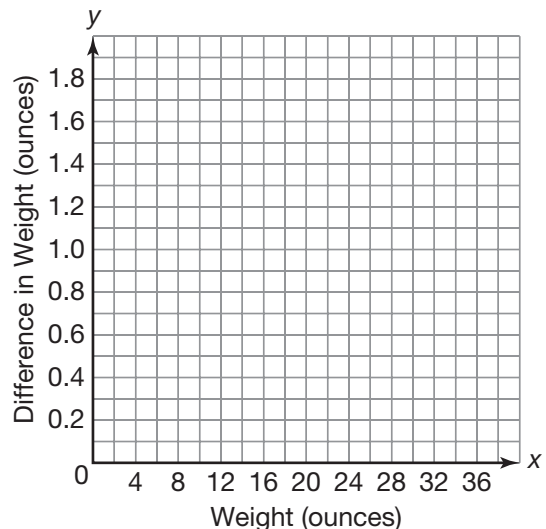


33. A snack company is filling bags with pita chips sold by weight. Each bag should contain 8 ounces of chips. The specifications allow for a difference of 0.25 ounce. The function  $f(x) = |x - 8|$  represents the difference between the weight of a bag of chips and the specifications. Graph the function. What weights meet the specifications?

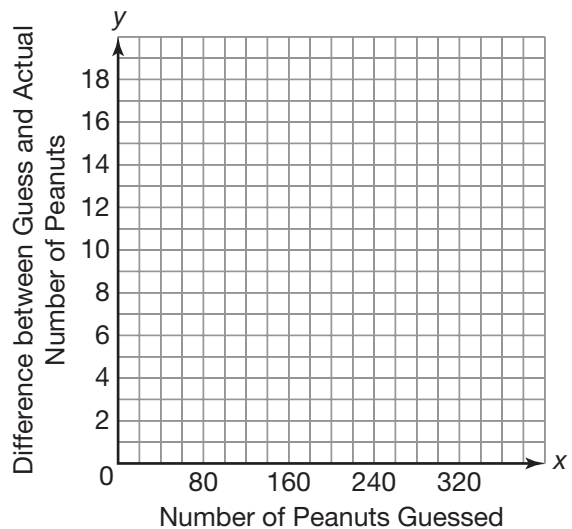


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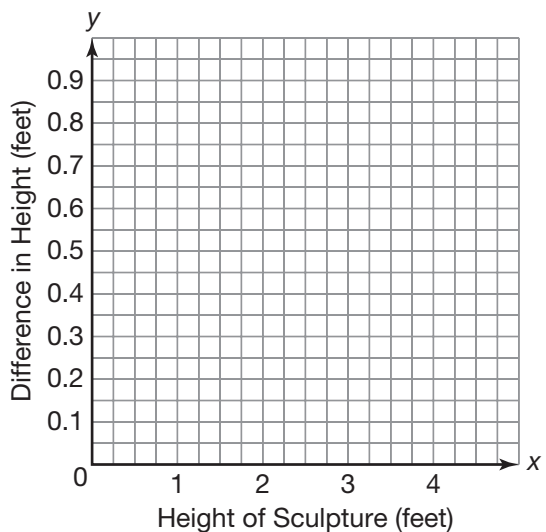
34. A cereal company is filling boxes with cereal sold by weight. Each box should contain 32 ounces of cereal. The specifications allow for a difference of 0.5 ounce. The function  $f(x) = |x - 32|$  represents the difference between the weight of a box of cereal and the specifications. Graph the function. What weights do not meet the specifications?



35. Guests at the school harvest festival are asked to guess how many peanuts are in a jar. The jar contains 260 peanuts. All guests within 10 peanuts of the correct answer win a prize. The function  $f(x) = |x - 260|$  represents the difference between a guess and the actual number of peanuts in the jar. Graph the function. What possible guesses will not win a prize?



36. The rules of an art contest state that sculptures submitted should be 3 feet high but allow for a difference of 6 inches. The function  $f(x) = |x - 3|$  represents the difference between a sculpture that is submitted and the specifications. Graph the function. What heights do not meet the specifications?





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**Choose Wisely!**  
**Understanding Non-Linear Graphs and Inequalities**

**Problem Set**

Choose the function that represents each problem situation.

1. Tonya is walking to school at a rate of 3 miles per hour.

**A**  $f(x) = 3x^2$

**B**  $f(x) = 3x$

**C**  $f(x) = 3^x$

**B**  $f(x) = 3x$

2. Guests at a craft fair are asked to guess how many beads are in a jar. The jar contains 220 beads. All guests within 10 beads of the correct answer win a prize.

**A**  $f(x) = |x - 220|$

**B**  $f(x) = 220 - x$

**C**  $f(x) = 220^x$

3. Mario buys a car for \$25,000. Each year the car loses  $\frac{1}{6}$  of its value.

**A**  $f(x) = 25,000 - \frac{1}{6}x$

**B**  $f(x) = \frac{1}{6}x^2 + 25,000$

**C**  $f(x) = 25,000\left(\frac{5}{6}\right)^x$

4. A bathtub filled with 50 gallons of water is drained. The water drains at a rate of 5 gallons per minute.

**A**  $f(x) = 50 - 5x$

**B**  $f(x) = 5x^2 - 50$

**C**  $f(x) = 50 - 5^x$

5. Rodell throws a football straight up with a speed of 25 feet per second. The acceleration of the ball due to gravity is 32 feet per second.

**A**  $f(x) = -32x + 25$

**B**  $f(x) = -32x^2 + 25x$

**C**  $f(x) = |32x - 25|$

6. A pasta company is filling boxes with pasta sold by weight. Each box should contain 16 ounces of pasta. The specifications allow for a difference of 0.5 ounce.

**A**  $f(x) = 16x - 0.5$

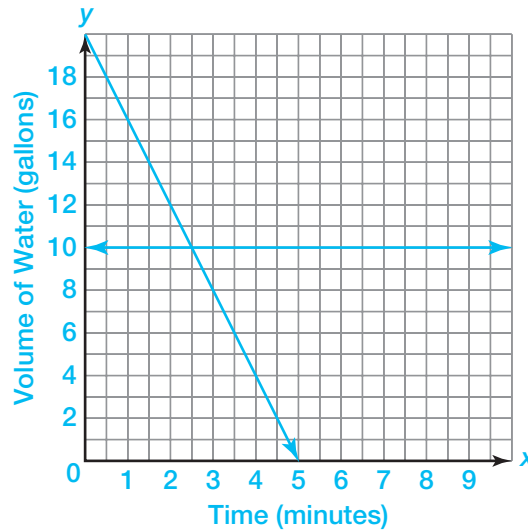
**B**  $f(x) = 16x^2 - 0.5x$

**C**  $f(x) = |x - 16|$

2

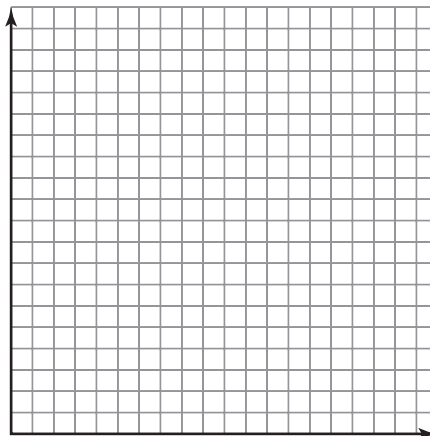
Graph the function that represents each problem situation. Use the graph to answer the question.

7. A fish tank filled with 20 gallons of water is drained. The water drains at a rate of 4 gallons per minute. The function  $f(x) = 20 - 4x$  represents the volume of water in the fish tank as it drains. Graph the function. How many minutes does it take for half of the water to drain from the tank?



After 2.5 minutes, half of the water in the tank (10 gallons) will be drained.

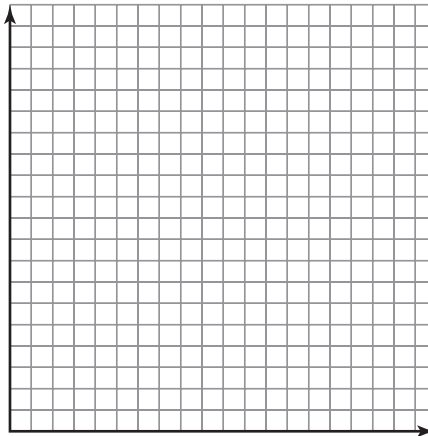
8. A pasta company is filling boxes with pasta sold by weight. Each box should contain 32 ounces of pasta. The specifications allow for a difference of 1.5 ounces. The function  $f(x) = |x - 32|$  represents the difference between the weight of a box of pasta and the specifications. Graph the function. What weights meet the specifications?



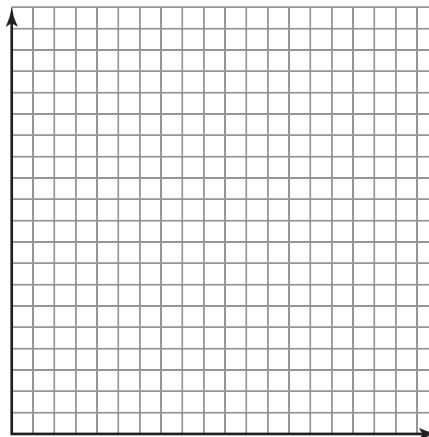
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**2**

9. Ronna buys a car for \$20,000. Each year the car loses  $\frac{1}{4}$  of its value. The function  $f(x) = 20,000\left(\frac{3}{4}\right)^x$  represents the value of the car over time. Graph the function. Ronna wants to eventually sell the car and make at least \$10,000 in the sale. Estimate the number of years Ronna can own the car before she must resell and still make at least \$10,000.

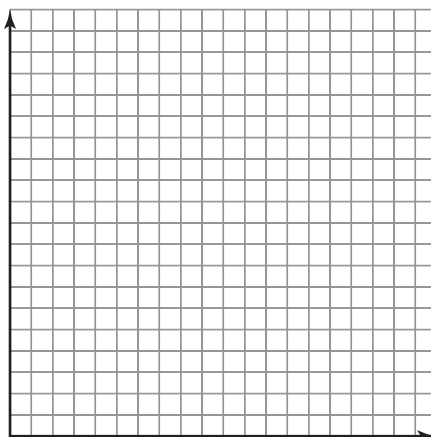


10. Serena is driving to her aunt's house at a rate of 55 miles per hour. The function  $f(x) = 55x$  represents the distance Serena travels over time. Graph the function. Estimate how long it will take Serena to get to her aunt's house which is 192 miles away.



2

11. Hector throws a softball straight up with a speed of 50 feet per second. The acceleration of the ball due to gravity is 32 feet per second. The function  $f(x) = -32x^2 + 50x$  represents the height of the softball as it travels up in the air and back to the ground. Graph the function. Estimate the length of time the softball is in the air.



12. Guests at a craft fair are asked to guess how many beads are in a jar. The jar contains 180 beads. All guests within 20 beads of the correct answer win a prize. The function  $f(x) = |x - 180|$  represents the difference between a guess and the actual number of beads in the jar. Graph the function. What possible guesses will win a prize?

