

## Sketching Graphs and Comparing Functions • Form B

### Examples 1 and 2

Use the key features of each function to sketch its graph.

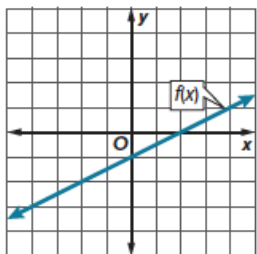
- x-intercept:** (2, 0)  
**y-intercept:** (0, -6)  
**Linearity:** linear  
**Continuity:** continuous  
**Positive:** for values  $x > 2$   
**Increasing:** for all values of  $x$   
**End Behavior:** As  $x \rightarrow \infty$ ,  $f(x) \rightarrow \infty$  and as  $x \rightarrow -\infty$ ,  $f(x) \rightarrow -\infty$ .
- x-intercept:** (5, 0)  
**y-intercept:** (0, 5)  
**Linearity:** linear  
**Continuity:** continuous  
**Positive:** for values  $x < 5$   
**Decreasing:** for all values of  $x$   
**End Behavior:** As  $x \rightarrow \infty$ ,  $f(x) \rightarrow -\infty$  and as  $x \rightarrow -\infty$ ,  $f(x) \rightarrow \infty$ .
- x-intercept:** (-1, 0) and (1, 0)  
**y-intercept:** (0, 1)  
**Linearity:** nonlinear  
**Continuity:** continuous  
**Symmetry:** symmetric about the line  $x = 0$   
**Positive:** for values  $-1 < x < 1$   
**Negative:** for values of  $x < -1$  and  $x > 1$   
**Increasing:** for all values of  $x < 0$   
**Decreasing:** for all values of  $x > 0$   
**Extrema:** maximum at (0, 1)  
**End Behavior:** As  $x \rightarrow \infty$ ,  $f(x) \rightarrow -\infty$  and as  $x \rightarrow -\infty$ ,  $f(x) \rightarrow -\infty$ .
- x-intercept:** (1, 0)  
**y-intercept:** (0, -1)  
**Linearity:** linear  
**Continuity:** continuous  
**Positive:** for values  $x > 1$   
**Increasing:** for all values of  $x$   
**End Behavior:** As  $x \rightarrow -\infty$ ,  $f(x) \rightarrow -\infty$  and as  $x \rightarrow \infty$ ,  $f(x) \rightarrow \infty$ .

### Example 3

- PELICANS** A pelican descends to the ground. The pelican starts at a height of 6 feet. The pelican reaches the ground, at a height of 0 feet, after 3 seconds. The function that models the situation is linear. Use the key features to sketch a graph.

### Examples 4 and 5

- Compare the key features of the functions represented with a graph and a table.

$f(x)$	$g(x)$												
	<table border="1"> <thead> <tr> <th><math>x</math></th><th><math>f(x)</math></th></tr> </thead> <tbody> <tr> <td>-2</td><td>-4</td></tr> <tr> <td>-1</td><td>-1</td></tr> <tr> <td>0</td><td>2</td></tr> <tr> <td>1</td><td>5</td></tr> <tr> <td>2</td><td>8</td></tr> </tbody> </table>	$x$	$f(x)$	-2	-4	-1	-1	0	2	1	5	2	8
$x$	$f(x)$												
-2	-4												
-1	-1												
0	2												
1	5												
2	8												

7. Compare the key features of the functions represented with a table and a verbal description.

$f(x)$		$g(x)$
$x$	$f(x)$	$x$ -intercept: $(1, 0)$
-4	0	$y$ -intercept: $(0, -7)$
-3	-3	relative maximum: none
-2	-4	relative minimum: none
-1	-3	end behavior: as
0	0	$x \rightarrow -\infty, g(x) \rightarrow -\infty$ and as
		$x \rightarrow \infty, g(x) \rightarrow \infty$

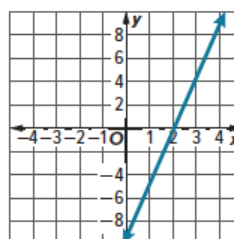
8. Compare the key features of the functions represented with a table and a verbal description.

$f(x)$		$g(x)$
$x$	$f(x)$	$x$ -intercept: $(\frac{3}{8}, 0)$
$-\frac{2}{3}$	1	$y$ -intercept: $(0, \frac{1}{2})$
$-\frac{1}{3}$	$\frac{3}{4}$	slope: $-\frac{4}{3}$
0	$\frac{1}{2}$	
$\frac{1}{3}$	$\frac{1}{4}$	
$\frac{2}{3}$	0	

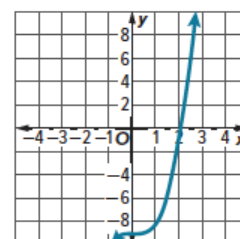
### MIXED EXERCISES

9. **USE A MODEL** Sketch the graph of a linear graph with the following key features. The  $x$ -intercept is 2. The  $y$ -intercept is 2. The function is decreasing for all values of  $x$ . The function is positive for  $x < 2$ . As  $x \rightarrow -\infty, f(x) \rightarrow \infty$  and as  $x \rightarrow \infty, f(x) \rightarrow -\infty$ .
10. **USE TOOLS** Monica walks for 60 minutes. She starts walking from her house. The maximum distance Monica is from her house is 2 miles, which she reaches 30 minutes after she starts walking. At the 30-minute mark, Monica starts walking back to her house for 30 minutes until she reaches her house. Use the key features to sketch a graph.
11. **SKI LIFT** A ski lift descends at a steady pace down a mountainside from a height of 1800 feet to ground level. If it makes no stops along the way to load or unload passengers, then the time it takes to complete its descension is 4 minutes.
- Is the graph that relates the lift's height as a function of time linear or nonlinear? Explain.
  - Use the key features to sketch a graph.
12. **CREATE** Choose a function and create a list key features to describe the function. Then sketch the function.
13. **WRITE** Describe the relationship between the slope of a linear function and when the function is increasing or decreasing.
14. **FIND THE ERROR** Linda and Rubio sketched a graph with the following key features. The  $x$ -intercept is 2. The  $y$ -intercept is -9. The function is positive for  $x > 2$ . As  $x \rightarrow -\infty, f(x) \rightarrow -\infty$  and as  $x \rightarrow \infty, f(x) \rightarrow \infty$ . Is either graph correct based on the key features? Explain your reasoning.

Linda's Graph



Rubio's Graph



**Graphing Linear Functions and Inequalities • Form B****Example 1****Graph each equation by using a table.**

1.  $4x - 1 = y$

2.  $y - 4 = -2x$

3.  $y + 3x = 1$

**Example 2****Graph each equation by using the  $x$ - and  $y$ -intercepts.**

4.  $3y - x = 6$

5.  $y - x = -3$

6.  $y - 2x = -3$

**Example 3****Graph each equation by using  $m$  and  $b$ .**

7.  $y = -\frac{5}{3}x + 12$

8.  $y = 4x - 15$

9.  $y - x = -4$

**Examples 4 and 5****Graph each inequality.**

10.  $y > 1$

11.  $x + y \leq 4$

12.  $2 - y < x$

13.  $x - y > -2$

14.  $y + 1 \geq 2x$

15.  $x > -5$

**Example 6**

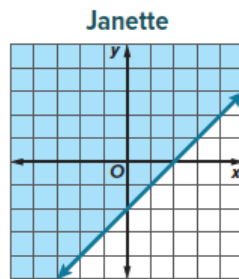
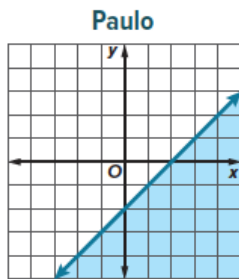
- 16. CRAFT FAIR** Kylie is going to try to sell two of her oil paintings at the local craft fair. She is hoping to earn at least \$400.

a. Write the inequality that represents the constraint of the situation, where  $x$  is the price of the first oil painting, and  $y$  is the price of the second.

b. Graph the inequality that represents the constraint on the sale.

- 17. WEIGHT** A delivery crew is going to load a truck with tables and chairs. The truck's weight limitations are represented by the inequality  $200t + 60c < 1200$ , where  $t$  is the number of tables and  $c$  is the number of chairs. Graph this inequality.

- 18. FIND THE ERROR** Paulo and Janette are graphing  $x - y \geq 2$ . Is either of them correct? Explain your reasoning.



- 19. CREATE** Write an inequality whose graph has a dashed boundary line. Then graph the inequality.

- 20. WRITE** You can graph a line by making a table, using the  $x$ - and  $y$ -intercepts, or by using  $m$  and  $b$ . Which method do you prefer? Explain your reasoning.