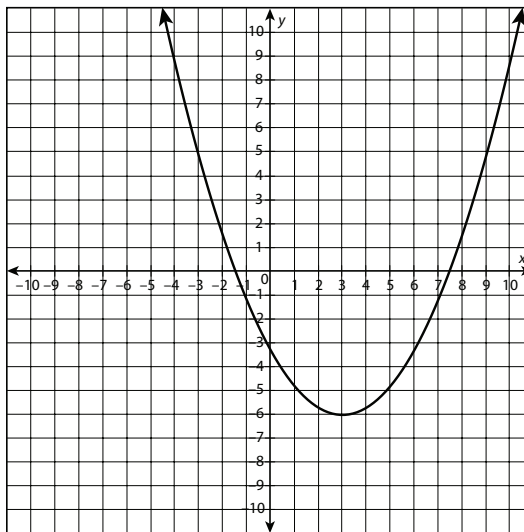


**UNIT 5 • COMPARING AND CONTRASTING FUNCTIONS****Unit Assessment****Assessment****Unit 5 Unit Assessment**

Circle the letter of the best answer.

1. For the following graph, identify the left and right end behaviors.



- |  |  |
|--|--|
| <p>a. left: approaching <math>\infty</math><br/>right: approaching <math>-\infty</math></p> <p>b. left: approaching <math>\infty</math><br/>right: approaching <math>\infty</math></p> | <p>c. left: approaching <math>-\infty</math><br/>right: approaching <math>-\infty</math></p> <p>d. left: approaching <math>-\infty</math><br/>right: approaching <math>\infty</math></p> |
|--|--|
2. Darla has \$300 in her savings account, which earns 2% each month. The total balance of Darla's account after  $x$  months is represented by the function  $m(x) = 300(1.02)^x$ . Identify the type of function and the left and right end behaviors on the restricted domain  $x \geq 0$ .
- linear  
left end behavior: approaching  $-\infty$   
right end behavior: approaching  $\infty$
  - exponential  
left end behavior: approaching 0  
right end behavior: approaching  $-\infty$
  - quadratic  
left end behavior: equals 300 (not increasing or decreasing)  
right end behavior: approaching  $\infty$
  - exponential  
left end behavior: equals 300 (not increasing or decreasing)  
right end behavior: approaching  $\infty$

**continued**

Name: \_\_\_\_\_

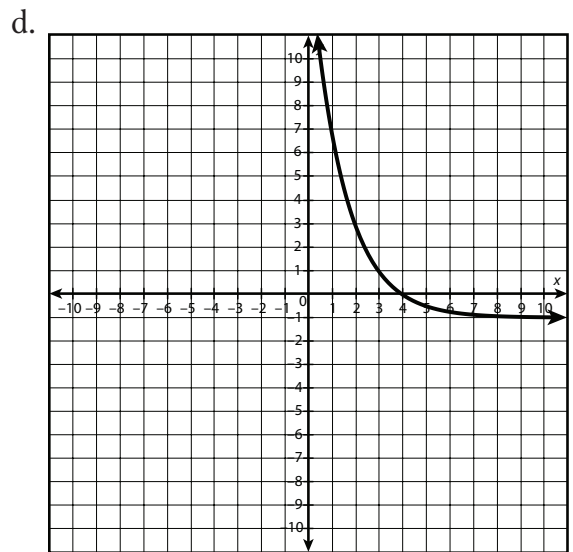
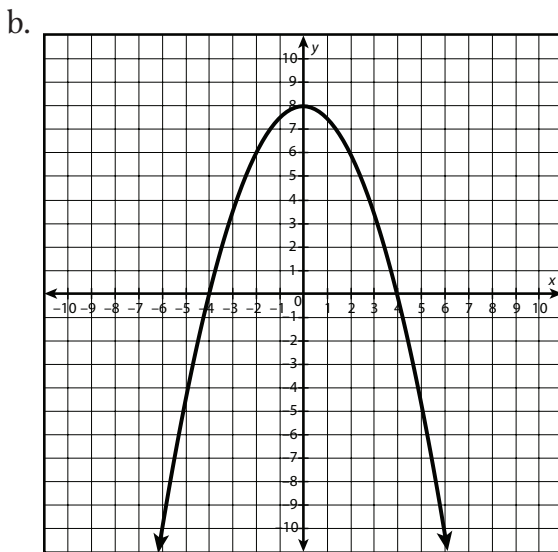
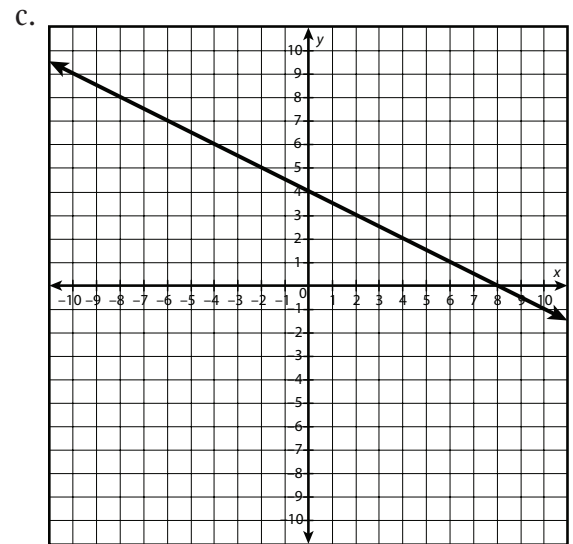
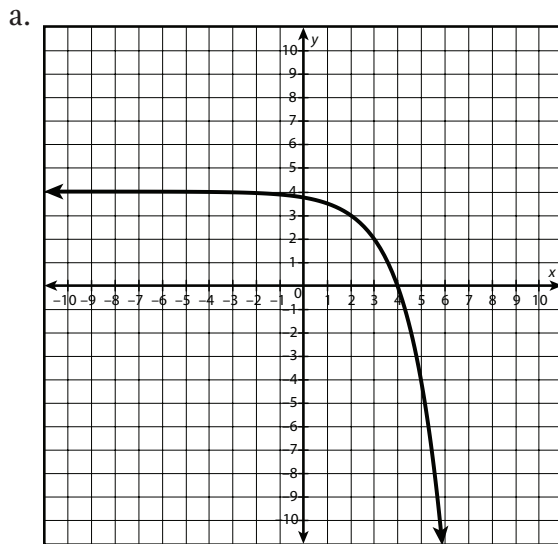
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## UNIT 5 • COMPARING AND CONTRASTING FUNCTIONS

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3. Which of the following graphs represents a function that is decreasing, is negative when  $x > 4$ , and has a left end behavior that approaches infinity?



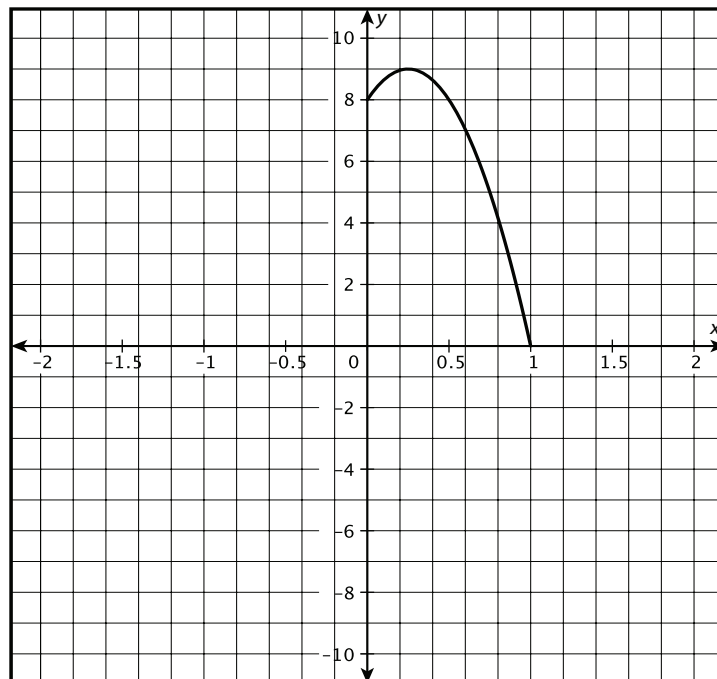
*continued*

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4. In the following table, what is the pattern between dependent values?

Tickets sold	Profit
10	\$80
20	\$160
30	\$240
40	\$320
50	\$400
60	\$480

- a. constant first difference  
b. constant second difference  
c. constant multiple  
d. There is no pattern in the values.
5. The following graph represents the height of an object that is launched upwards into the air from a height of 8 feet. What is the approximate rate of change on the interval  $[0.2, 1]$ ?



- a.  $-9$   
b.  $-11.25$   
c.  $-0.8$   
d.  $-7.5$

**continued**

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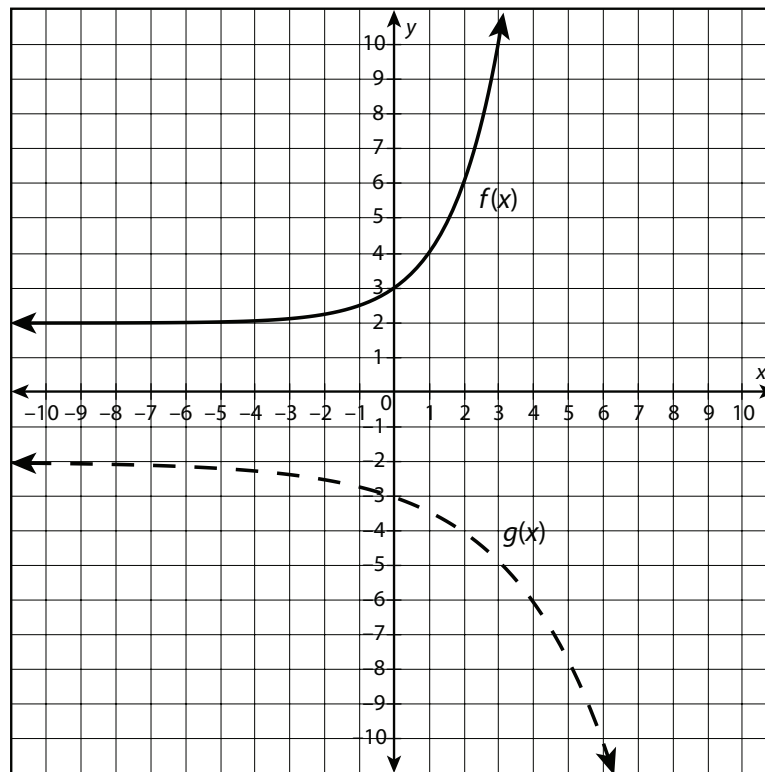
6. Let  $f(x) = 5x^2 + 4$  and  $g(x) = 2 \cdot 3^x$ . Which of the following statements is true?

- $f(x)$  increases faster than  $g(x)$  on the interval  $[0, 5]$ .
- $g(x)$  increases faster than  $f(x)$  on the interval  $[0, 5]$ .
- $f(x)$  and  $g(x)$  have the same rate of change on the interval  $[0, 5]$ .
- $f(x)$  will always be greater than  $g(x)$ .

7. Which function is a translation 6 units left of  $f(x) = 2x - 5$ ?

- $g(x) = 2x - 17$
- $g(x) = 2x + 7$
- $g(x) = 2x - 12$
- $g(x) = 2x + 1$

8. Let  $f(x) = 2^x + 2$ . Which of the following could be  $g(x)$ ?



- $g(x) = 2^x - 2$
- $g(x) = 2 \cdot 2^x + 2$
- $g(x) = -2^x - 2$
- $g(x) = -2^{\frac{x}{2}} - 2$

**continued**

## UNIT 5 • COMPARING AND CONTRASTING FUNCTIONS

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9. Let  $f(x) = 3(x - 4)^2 - 4$ . If  $g(x)$  is the translation 4 units left of  $f(x)$ , is  $g(x)$  even, odd, or neither?
- a.  $g(x)$  is both even and odd.
  - b.  $g(x)$  is even but not odd.
  - c.  $g(x)$  is odd but not even.
  - d.  $g(x)$  is neither even nor odd.
10. There are 11 grams of a radioactive isotope in a sample. Half the sample decays every 3 years. What type of function models this situation?
- a. linear
  - b. exponential
  - c. quadratic
  - d. none of these
11. A movie theater charges \$8 per person for tickets. If a group of 5 people went to the theater 4 times, how much did they pay in total?
- a. \$40
  - b. \$32
  - c. \$160
  - d. \$80
12. The following table lists the number of tourists (in thousands) visiting a small town each year from 2001 to 2007. The number of tourists (in thousands) visiting a competing town in the same time period is modeled by the function  $y = -0.25(x - 3)^2 + 8$ . Which shows a greater increase from 2001 to 2003, the equation or the table? *Note:*  $x = 1$  corresponds to 2001.

$x$	$y$
1	3
2	4
3	5
4	6
5	7
6	8
7	9

- a. The equation increases faster than the table from 2001 to 2003.
- b. The table increases faster than the equation from 2001 to 2003.
- c. The equation increases at the same rate as the table from 2001 to 2003.
- d. There is not enough information to solve this problem.

**continued**

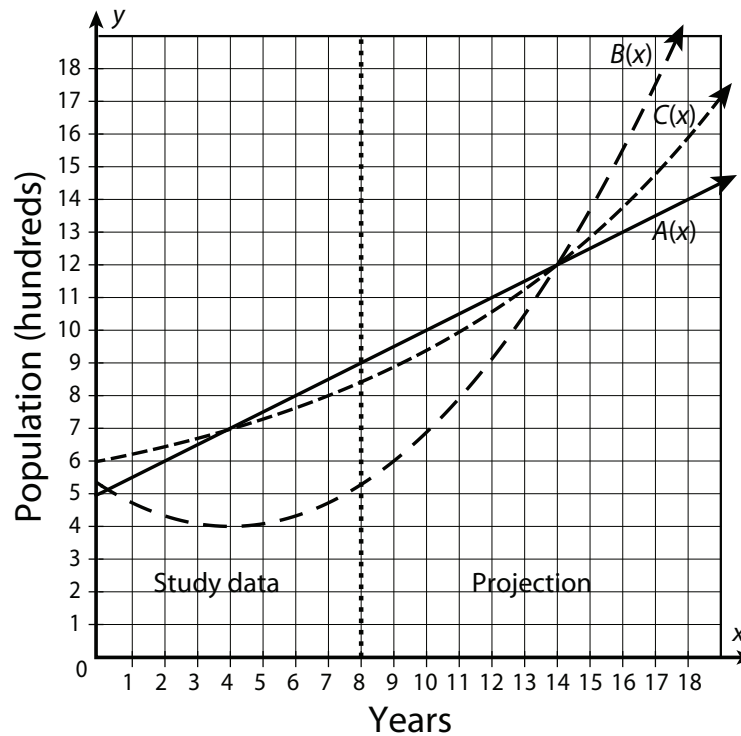
## UNIT 5 • COMPARING AND CONTRASTING FUNCTIONS

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For problems 13–15, read each scenario and answer the questions that follow.

13. Researchers participating in an 8-year study of voles in three different areas derived different population functions for their respective locations. Researcher A found a linear population trend, researcher B found a quadratic population trend, and researcher C found an exponential population trend. The following graph shows the function curves, including both the actual study data and a 10-year projection.



- Identify the domain of the functions.
- Describe the end behavior of  $A(x)$ .
- Describe the end behavior of  $B(x)$ .
- Describe the end behavior of  $C(x)$ .
- If these trends continue, which population will eventually be the greatest? How do you know?

*continued*

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14. Suppose  $f(x) = 4x + 5$ .

a. Find  $g(x)$  if  $g(x)$  translates  $f(x)$  5 units down.

b. Find  $h(x)$  if  $h(x)$  vertically compresses  $f(x)$  by a factor of 0.5.

c. Find  $j(x)$  such that  $j(x)$  is the reflection of  $f(x)$  across the  $y$ -axis.

d. Determine whether  $f(x)$ ,  $g(x)$ ,  $h(x)$ , and  $j(x)$  are even, odd, or neither.

*continued*

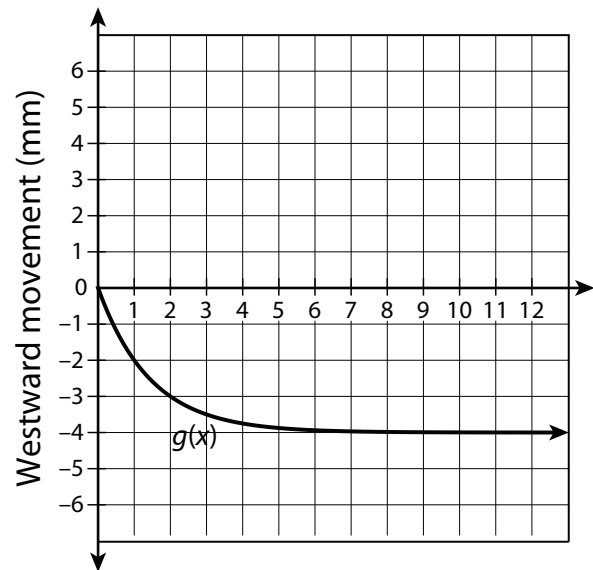
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15. Charlie and Vivian are studying plate boundaries and seafloor spread. They placed super-accurate GPS devices on the ocean floor in order to record how those points have moved. The following table shows the seafloor's northward movement. The graph shows the seafloor's westward movement.

Months ( $x$ )	Northward movement, in mm ( $f(x)$ )
0	0
1	1
2	2
3	3
4	4
5	5
6	6
7	7
8	8
9	9
10	10



- What is the rate of change for  $f(x)$  between  $x = 0$  and  $x = 2$ ?
- What is the rate of change for  $g(x)$  between  $x = 0$  and  $x = 2$ ?
- In which direction has the marker moved farthest after 6 months?
- If this trend continues, will the seafloor be moving faster in the westward direction or the northward direction?