PRACTICE & PROBLEM SOLVING

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Practice Tutorial

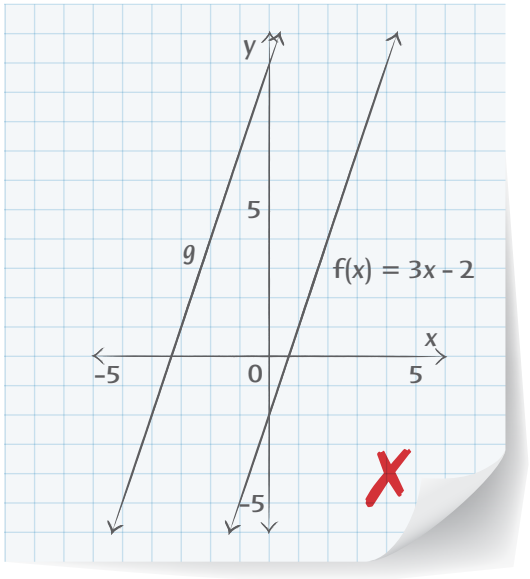
Additional Exercises Available Online

UNDERSTAND

10. Reason Describe the transformation of the function $f(x) = \frac{1}{2}x - 2$ that makes the slope 2 and the y-intercept –8.

11. Look for Relationships Why do translations produce parallel lines?

12. Error Analysis A student graphs $f(x) = 3x - 2$. On the same grid they graph the function g which is a transformation of f made by subtracting 4 from the input of f. Describe and correct the error they made when graphing g.



13. Look for Relationships Let $f(x) = \frac{1}{2}x - 3$. Suppose you subtract 6 from the input of f to create a new function g, then multiply the input of function g by 4 to create a function h. What equation represents h?

14. Use Structure Describe each transformation. Then write the equation of the transformed function.

$f(x) = 2x + 1$ $\quad$ $g(x) = \frac{1}{3}x + 2$

	Transformation	Description	Function
a.	$f(x) - 5$		
b.	$g(x) + 4$		
c.	$3g(x)$		
d.	$\frac{1}{2}f(x)$		

PRACTICE

Given $f(x) = 3x + 5$, describe how the graph of g compares with the graph of f.

SEE EXAMPLES 1, 2, AND 3

15. $g(x) = (3x + 5) + 8$ **16.** $g(x) = (3x + 5) - 4$

17. $g(x) = 3(x + 10) + 5$ **18.** $g(x) = 3(x - 1) + 5$

19. $g(x) = 3(0.1x) + 5$ **20.** $g(x) = 5(3x + 5)$

21. $g(x) = 3(2x) + 5$ **22.** $g(x) = 8(3x + 5)$

Given $f(x) = 2x + 3$, describe how the value of k affects the slope and y-intercept of the graph of g compared to the graph of f. SEE EXAMPLE 3

23. $g(x) = 3(2x + 3)$ **24.** $g(x) = 2(0.5x) + 3$

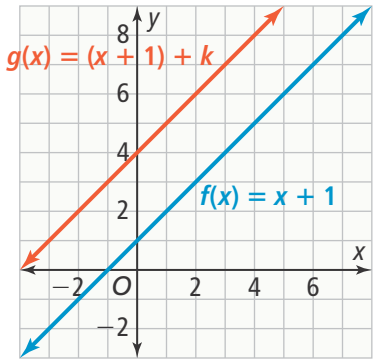
25. $g(x) = \frac{1}{6}(2x + 3)$ **26.** $g(x) = 2\left(\frac{1}{8}\right)x + 3$

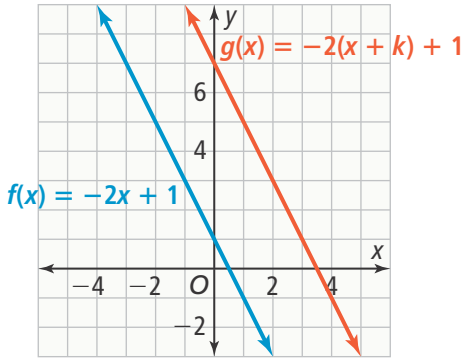
27. $g(x) = (2x + 3) - 3$ **28.** $g(x) = 2(x + 0.5) + 3$

k *g*

g

f





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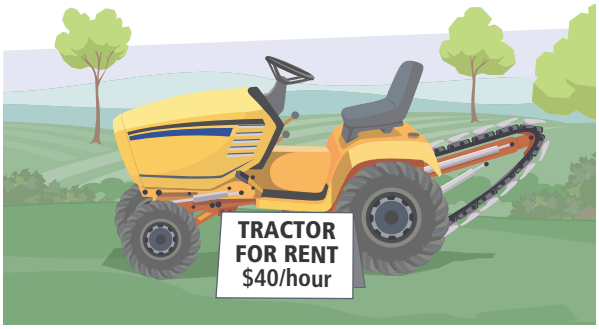
Mixed Review Available Online

APPLY

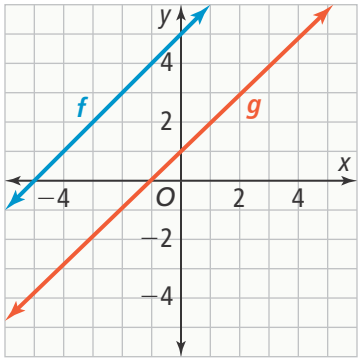
31. **Mathematical Connections** The cost of renting a landscaping tractor is a $100 security deposit plus the hourly rate.



a. The function f represents the cost of renting the tractor. The function g represents the cost if the hourly rate were doubled. Write each function.

b. How would the slope and y-intercept of the graph g compare to the slope and y-intercept of the graph of f?

32. **Construct Arguments** Veronica said the graph of g below represents a vertical translation of the function $f(x) = x + 1$ by 4 units. Dawn argued that the graph of g represents a horizontal translation of f by 4 units. Who is correct? Explain.



33. **Higher Order Thinking** The graph of a linear function f has a negative slope. Describe the effect on the graph of the function if the transformation has a value of $k < 0$.

a. adding k to the outputs of f

b. adding k to the inputs of f

c. multiplying the outputs of f by k

d. multiplying the inputs of f by k

ASSESSMENT PRACTICE

34. How is the graph of the function $g(x) = \frac{2}{5}x + 6$ transformed from the graph of the function $f(x) = \frac{2}{5}x$?

Ⓐ Moved up 6 units

Ⓑ Moved down 6 units

Ⓒ Moved left 6 units

Ⓓ Moved right 6 units

35. **SAT/ACT** Which of the following describes the differences between the graph of f and the graph of the output of f multiplied by 3?

Ⓐ The slope changes by a factor of 3; the y-intercept does not change.

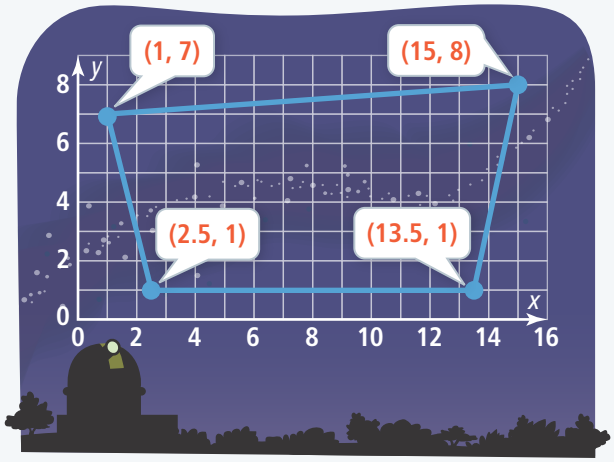
Ⓑ Both the slope and y-intercept change by a factor of 3.

Ⓒ The slope does not change; the y-intercept changes by a factor of 3.

Ⓓ Neither the slope nor y-intercept change.

36. **Performance Task** The science club members are using transformations on coordinate grids to track the movement of constellations in the sky.

Choose one side of the constellation depicted below and describe a series of transformations to move the side.



Copy and complete the table to record the motion.

Transformation	Function

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