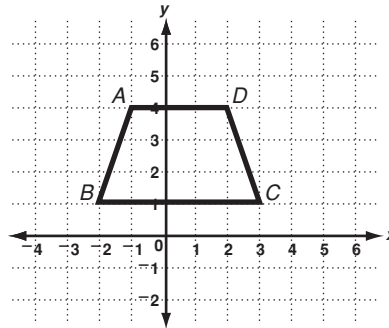


**LESSON**  
**1-8**

**Practice C**  
**Exploring Transformations**

Transform trapezoid  $ABCD$  as indicated.  
Estimate the area of each transformed trapezoid as compared to the area of trapezoid  $ABCD$ .



1. reflection across the  $x$ -axis

\_\_\_\_\_

2. horizontal compression by a factor of  $\frac{1}{2}$

\_\_\_\_\_

3. horizontal stretch by a factor of 2

\_\_\_\_\_

4. vertical compression by a factor of  $\frac{1}{2}$

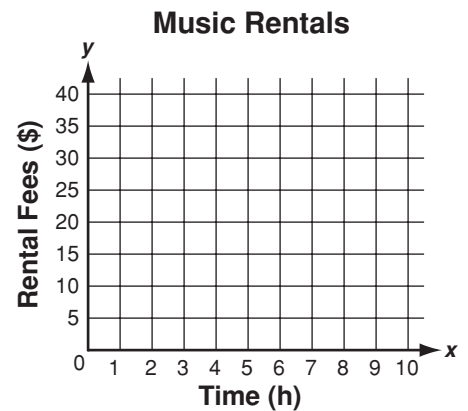
\_\_\_\_\_

5. vertical stretch by a factor of  $\frac{3}{2}$

\_\_\_\_\_

Tucci's House of Music rents practice space and musical instruments. Use of a practice room costs \$10 for the first 2 hours and \$4 for each additional hour. An electric guitar rents for \$15 for the first 2 hours and \$3 for each additional hour.

6. Sketch a graph of two functions, one for the cost of renting a practice room and another for the cost of renting an electric guitar.



Identify the transformation of the original graphs represented by the following changes.

7. The charge for the first 2 hours' rental of a practice room increases to \$12.

\_\_\_\_\_

8. As a special promotion, Tucci's House of Music cuts the practice room charges by 50% for first-time users.

\_\_\_\_\_

9. The cost of renting a guitar increases to \$30 for the first 4 hours and \$6 for each additional hour.

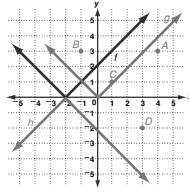
\_\_\_\_\_

**LESSON** **Practice A**

**1-8 Exploring Transformations**

Use the graph to perform each transformation described.

- Plot point A at (4, 3). Translate point A left 5 units. Label this point B. Give the coordinates of point B.  
 \_\_\_\_\_  
 (-1, 3)



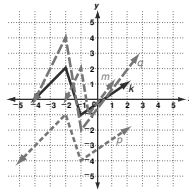
- Plot point C at (1, 1). Translate point C right 2 units and down 3 units. Label this point D. Give the coordinates of point D.  
 \_\_\_\_\_  
 (3, -2)

- Transform  $y = f(x)$  by translating it right 2 units. Label the new function g. Compare the points that make up the 2 functions. Which coordinate changes, x or y?  
 \_\_\_\_\_  
 x-coordinate

- Transform  $y = f(x)$  by reflecting it across the x-axis. Label the new function h. Which coordinate changes, x or y?  
 \_\_\_\_\_  
 y-coordinate

Use the graph to perform each transformation described.

- Transform  $y = k(x)$  by compressing it horizontally by a factor of  $\frac{1}{2}$ . Label the new function m. Which coordinate is multiplied by  $\frac{1}{2}$ , x or y?  
 \_\_\_\_\_  
 x-coordinate



- Transform  $y = k(x)$  by translating it down 3 units. Label the new function p. What happens to the y-coordinate in each new ordered pair?  
 \_\_\_\_\_  
 It is 3 less than the original y-coordinate.

- Transform  $y = k(x)$  by stretching it vertically by a factor of 2. Label the new function q. Which coordinate is multiplied by 2, x or y?  
 \_\_\_\_\_  
 y-coordinate

- Describe how the coordinates of a function change when it is translated 2 units to the left and 4 units up.  
 \_\_\_\_\_  
 (x, y) becomes (x - 2, y + 4).

- Describe how the coordinates of a function change when you vertically compress a function by a factor of  $\frac{2}{3}$ . (x, y) becomes (x,  $\frac{2}{3}y$ ).  
 \_\_\_\_\_

**LESSON** **Practice B**

**1-8 Exploring Transformations**

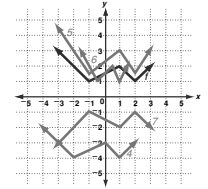
Perform the given translation on the point (2, 5) and give the coordinates of the translated point.

- left 3 units \_\_\_\_\_ (-1, 5)
- down 6 units \_\_\_\_\_ (2, -1)
- right 4 units, up 2 units \_\_\_\_\_ (6, 7)

Use the table to perform each transformation of  $y = f(x)$ . Use the same coordinate plane as the original function.

- translation left 1 unit, down 5 units

$x - 1$	x	y	$y - 5$
-4	-3	3	-2
-2	-1	1	-4
0	1	2	-3
1	2	1	-4
2	3	2	-3



- vertical stretch factor of  $\frac{3}{2}$
- horizontal compression factor of  $\frac{1}{2}$
- reflection across x-axis

x	y	$\frac{3}{2}y$
-3	3	$\frac{9}{2}$
-1	1	$\frac{3}{2}$
1	2	3
2	1	$\frac{3}{2}$
3	2	3

$\frac{1}{2}x$	x	y
$-\frac{3}{2}$	-3	3
$-\frac{1}{2}$	-1	1
$\frac{1}{2}$	1	2
1	2	1
$\frac{3}{2}$	3	2

x	y	-y
-3	3	-3
-1	1	-1
1	2	-2
2	1	-1
3	2	-2

Solve.

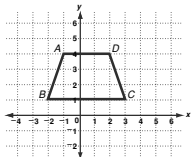
- George has a goal for the number of computers he wants to sell each month for the next 6 months at his computer store. He draws a graph to show his projected profits for that period. Then he decides to discount the prices by 10%. How will this affect his profits? Identify the transformation to his graph and describe how to find the ordered pairs for the transformation.

Profits are reduced by 10%; vertical compression; (x, 0.9y).

**LESSON** **Practice C**

**1-8 Exploring Transformations**

Transform trapezoid ABCD as indicated. Estimate the area of each transformed trapezoid as compared to the area of trapezoid ABCD.



- reflection across the x-axis  
 \_\_\_\_\_  
 Areas are equal.

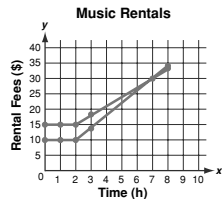
- horizontal compression by a factor of  $\frac{1}{2}$   
 \_\_\_\_\_  
 Area is  $\frac{1}{2}$  of original trapezoid.

- horizontal stretch by a factor of 2  
 \_\_\_\_\_  
 Area is doubled.

- vertical compression by a factor of  $\frac{1}{2}$   
 \_\_\_\_\_  
 Area is  $\frac{1}{2}$  of original trapezoid.

- vertical stretch by a factor of  $\frac{3}{2}$   
 \_\_\_\_\_  
 Area is  $\frac{3}{2}$  of original trapezoid.

Tucci's House of Music rents practice space and musical instruments. Use of a practice room costs \$10 for the first 2 hours and \$4 for each additional hour. An electric guitar rents for \$15 for the first 2 hours and \$3 for each additional hour.



- Sketch a graph of two functions, one for the cost of renting a practice room and another for the cost of renting an electric guitar.

Identify the transformation of the original graphs represented by the following changes.

- The charge for the first 2 hours' rental of a practice room increases to \$12.  
 \_\_\_\_\_  
 Translation

- As a special promotion, Tucci's House of Music cuts the practice room charges by 50% for first-time users.  
 \_\_\_\_\_  
 Vertical compression

- The cost of renting a guitar increases to \$30 for the first 4 hours and \$6 for each additional hour.  
 \_\_\_\_\_  
 Horizontal stretch and translation

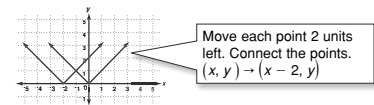
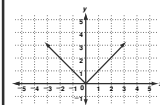
**LESSON** **Review for Mastery**

**1-8 Exploring Transformations**

A translation moves a point, figure, or function right, left, up, or down.

Horizontal Translation (right or left)	Vertical Translation (up or down)
The x-coordinate changes. (x, y) → (x + h, y)	The y-coordinate changes. (x, y) → (x, y + k)

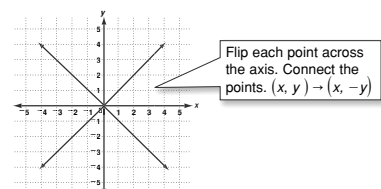
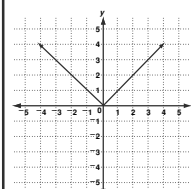
Translate the function  $y = f(x)$  left 2 units.



A reflection flips a point, figure, or function across a line.

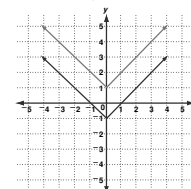
Reflection Across y-axis	Reflection Across x-axis
The x-coordinate changes. (x, y) → (-x, y)	The y-coordinate changes. (x, y) → (x, -y)

Reflect the function  $y = f(x)$  across the x-axis.



Perform each transformation of  $y = f(x)$ .

- translation up 2 units



- reflection across x-axis

