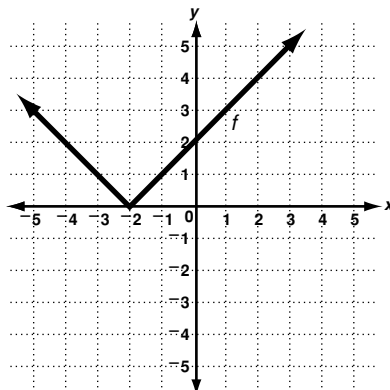


LESSON
1-8 **Practice A**
Exploring Transformations

Use the graph to perform each transformation described.



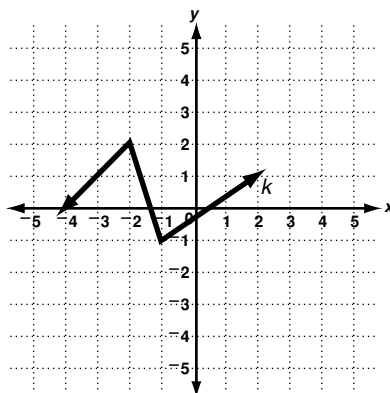
- Plot point A at $(4, 3)$. Translate point A left 5 units. Label this point B . Give the coordinates of point B .

- 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 .

- 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 ?

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

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 ?

- 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?

- 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 ?

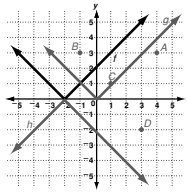
- Describe how the coordinates of a function change when it is translated 2 units to the left and 4 units up.

- Describe how the coordinates of a function change when you vertically compress a function by a factor of $\frac{2}{3}$.

LESSON **Practice A**
1-8 Exploring Transformations

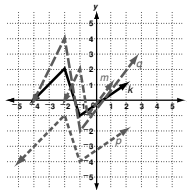
Use the graph to perform each transformation described.

- 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**
1-3 Exploring Transformations

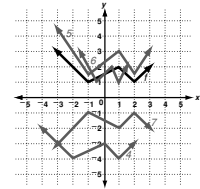
Perform the given translation on the point (2, 5) and give the coordinates of the translated point.

- 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 |

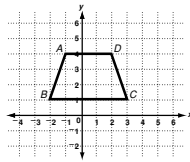
| x | y | $-y$ |
|-----|-----|------|
| -3 | 3 | -3 |
| -1 | 1 | -1 |
| 1 | 2 | -2 |
| 2 | 1 | -1 |
| 3 | 2 | -2 |

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

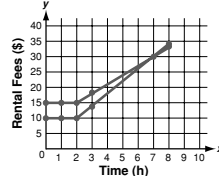
Transform trapezoid ABCD as indicated. Estimate the area of each transformed trapezoid as compared to the area of trapezoid ABCD.



- 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.

Music Rentals



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

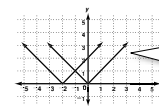
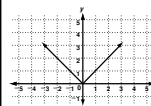
- The charge for the first 2 hours' rental of a practice room increases to \$12.
Translation
- As a special promotion, Tucci's House of Music cuts the practice room charges by 50% for first-time users.
Vertical compression
- The cost of renting a guitar increases to \$30 for the first 4 hours and \$6 for each additional hour.
Horizontal stretch and translation

LESSON **Reteach**
1-3 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. $(x, y) \rightarrow (x + h, y)$ | The y -coordinate changes. $(x, y) \rightarrow (x, y + k)$ |

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

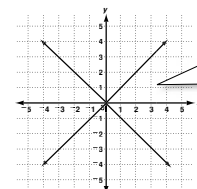
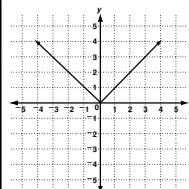


Move each point 2 units left. Connect the points.
 $(x, y) \rightarrow (x - 2, y)$

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

| Reflection Across y -axis | Reflection Across x -axis |
|--|--|
| The x -coordinate changes. $(x, y) \rightarrow (-x, y)$ | The y -coordinate changes. $(x, y) \rightarrow (x, -y)$ |

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



Flip each point across the axis. Connect the points. $(x, y) \rightarrow (x, -y)$

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

- translation up 2 units
- reflection across x -axis

