

# Shape Shifter: A Student Activity

The purpose of this activity is for students to gain experience in the properties of orientation and congruence of rotations, reflections, and translations of two-dimensional shapes on a coordinate plane.

- Use the graph paper vertically. Place the origin in the center.
- Locate and label points A-D:  
\_\_\_\_\_
- Connect points ABCDA. What is the name of this shape?  
\_\_\_\_\_
- Add 10 to each first coordinate and 5 to each second coordinate to get A<sub>1</sub> - D<sub>1</sub>. Locate and connect these new points to make a congruent shape to ABCD.  
\_\_\_\_\_
- Draw a straight arrow from A to A<sub>1</sub>. What is the horizontal and vertical distance from A to A<sub>1</sub>?  
\_\_\_\_\_
- From A - D, add 10 to each first coordinate and subtract 5 to each second coordinate to get A<sub>2</sub> - D<sub>2</sub>. Locate and connect these new points to make a new shape.  
\_\_\_\_\_
- Draw a straight arrow from A to A<sub>2</sub>. What is the horizontal and vertical distance from A to A<sub>2</sub>?  
\_\_\_\_\_
- What type of motion will move shape ABCD onto A<sub>2</sub>B<sub>2</sub>C<sub>2</sub>D<sub>2</sub>?  
\_\_\_\_\_
- What would you do to the coordinates of A, B, C, and D to translate shape ABCD 10 units to the left and 5 up? Locate and connect these new coordinates A<sub>3</sub> - D<sub>3</sub>.  
\_\_\_\_\_
- What would you do to the coordinates of A, B, C, and D to translate shape ABCD 10 units to the left and 5 down? Locate and connect these new coordinates A<sub>4</sub> - D<sub>4</sub>.  
\_\_\_\_\_
- Without drawing it - what would be the new coordinates of the vertices, if shape ABCD was moved 8 units to the right and 12 up. Fill in table A<sub>5</sub> - D<sub>5</sub> with your answer.
- Without drawing it - what would be the new coordinates of the vertices, if shape ABCD was moved 7 units to the left and 9 down. Fill in table A<sub>6</sub> - D<sub>6</sub> with your answer.

POINT	ORDERED PAIR
A	(-4, -2)
B	(-2, 2)
C	(1, 2)
D	(5, -2)

POINT	ORDERED PAIR
A <sub>1</sub>	(6, 3)
B <sub>1</sub>	( , )
C <sub>1</sub>	( , )
D <sub>1</sub>	( , )

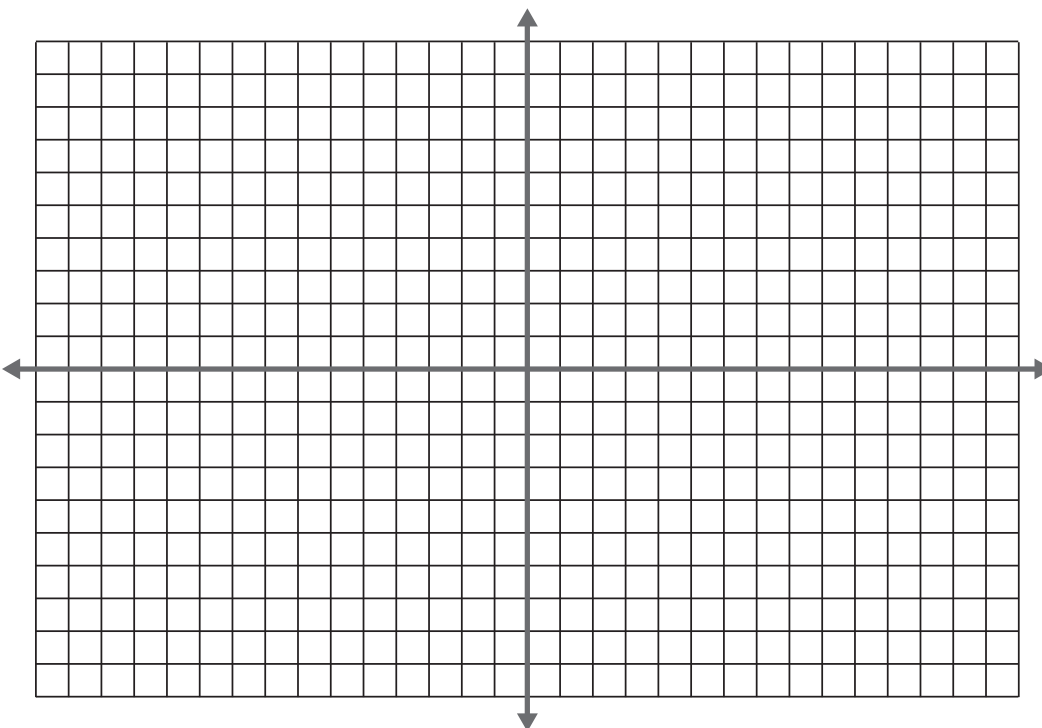
POINT	ORDERED PAIR
A <sub>2</sub>	(6, -7)
B <sub>2</sub>	( , )
C <sub>2</sub>	( , )
D <sub>2</sub>	( , )

POINT	ORDERED PAIR
A <sub>3</sub>	( , )
B <sub>3</sub>	( , )
C <sub>3</sub>	( , )
D <sub>3</sub>	( , )

POINT	ORDERED PAIR
A <sub>4</sub>	( , )
B <sub>4</sub>	( , )
C <sub>4</sub>	( , )
D <sub>4</sub>	( , )

POINT	ORDERED PAIR
A <sub>5</sub>	( , )
B <sub>5</sub>	( , )
C <sub>5</sub>	( , )
D <sub>5</sub>	( , )

POINT	ORDERED PAIR
A <sub>6</sub>	( , )
B <sub>6</sub>	( , )
C <sub>6</sub>	( , )
D <sub>6</sub>	( , )



# Shape Shifter: Student Activity Answers

The purpose of this activity is for students to gain experience in the properties of orientation and congruence of rotations, reflections, and translations of two-dimensional shapes on a coordinate plane.

- Use the graph paper vertically. Place the origin in the center.
- Locate and label points A-D:
- Connect points ABCDA. What is the name of this shape?  
trapezoid
- Add 10 to each first coordinate and 5 to each second coordinate to get A<sub>1</sub> - D<sub>1</sub>. Locate and connect these new points to make a congruent shape to ABCDA.
- Draw a straight arrow from A to A<sub>1</sub>. What is the horizontal and vertical distance from A to A<sub>1</sub>?  
horizontal=10; vertical=5
- From A - D, add 10 to each first coordinate and subtract 5 to each second coordinate to get A<sub>2</sub> - D<sub>2</sub>. Locate and connect these new points to make a new shape.
- Draw a straight arrow from A to A<sub>2</sub>. What is the horizontal and vertical distance from A to A<sub>2</sub>?  
horizontal=10; vertical=5
- What type of motion will move shape ABCD onto A<sub>2</sub>B<sub>2</sub>C<sub>2</sub>D<sub>2</sub>?  
translation
- What would you do to the coordinates of A, B, C, and D to translate shape ABCD 10 units to the left and 5 up? Locate and connect these new coordinates A<sub>3</sub> - D<sub>3</sub>.  
add -10 to 1<sup>st</sup> coordinate and 5 to the 2<sup>nd</sup> coordinate
- What would you do to the coordinates of A, B, C, and D to translate shape ABCD 10 units to the left and 5 down? Locate and connect these new coordinates A<sub>4</sub> - D<sub>4</sub>.  
add -10 to 1<sup>st</sup> coordinate & subtract 5 from the 2<sup>nd</sup> coordinate
- Without drawing it - what would be the new coordinates of the vertices, if shape ABCD was moved 8 units to the right and 12 up. Fill in table A<sub>5</sub> - D<sub>5</sub> with your answer.
- Without drawing it - what would be the new coordinates of the vertices, if shape ABCD was moved 7 units to the left and 9 down. Fill in table A<sub>6</sub> - D<sub>6</sub> with your answer.

POINT	ORDERED PAIR
A	( -4 , -2 )
B	( -2 , 2 )
C	( 1 , 2 )
D	( 5 , -2 )

POINT	ORDERED PAIR
A <sub>1</sub>	( 6 , 3 )
B <sub>1</sub>	( 8 , 7 )
C <sub>1</sub>	( 11 , 7 )
D <sub>1</sub>	( 15 , 3 )

POINT	ORDERED PAIR
A <sub>2</sub>	( 6 , -7 )
B <sub>2</sub>	( 8 , -3 )
C <sub>2</sub>	( 11 , -3 )
D <sub>2</sub>	( 15 , -7 )

POINT	ORDERED PAIR
A <sub>3</sub>	( -14 , 3 )
B <sub>3</sub>	( -12 , 7 )
C <sub>3</sub>	( -9 , 7 )
D <sub>3</sub>	( -5 , 3 )

POINT	ORDERED PAIR
A <sub>4</sub>	( -14 , -7 )
B <sub>4</sub>	( -12 , -3 )
C <sub>4</sub>	( -9 , -3 )
D <sub>4</sub>	( -5 , -7 )

POINT	ORDERED PAIR
A <sub>5</sub>	( 4 , 10 )
B <sub>5</sub>	( 6 , 14 )
C <sub>5</sub>	( 9 , 14 )
D <sub>5</sub>	( 13 , 10 )

POINT	ORDERED PAIR
A <sub>6</sub>	( -11 , -11 )
B <sub>6</sub>	( -9 , -7 )
C <sub>6</sub>	( -6 , -7 )
D <sub>6</sub>	( -2 , -11 )

