For the following problems, attach a piece of grid paper to the cardboard using tape. Draw the *x*- and *y*- axes on the grid paper. Place a piece of tracing paper over the grid paper and secure it to the cardboard with the pushpin through the origin. Mark the *x*- and *y*- axes on the grid paper. Plot the given points to create the endpoints or vertices of a shape and label with the corresponding letters.

When the directions say to change shapes, remove the tracing paper and replace it with another piece of tracing paper. Save the tracing paper from the previous shape (you will use it in subsequent activities). Mark the *x*- and *y*- axes on the new piece of tracing paper and repeat the directions with the new shape.

Activity 1: 90° Rotation

On a piece of tracing paper, plot these points to create the vertices of triangle ABC.
A (-2, 1), B (-2, 7), C (-6, 1)

1. Rotate the triangle through the origin 90° counterclockwise. Record the vertices of the rotated image in the table.

	Original Image	Rotated Image
A		
B		
C		
any	(x, y)	

2. Find the slope of each side of the original image and each side of the rotated image. Record the slopes in the table.

	Original Image	Rotated Image
Slope AB		
Slope BC		
Slope AC		
any	m	

On a piece of tracing paper, plot these points to create the vertices of triangle DEF.
D (-7, 0), E (-5, -3), F (-2, -1)

1. Rotate the triangle through the origin 90° counterclockwise. Record the vertices of the rotated image in the table.

	Original Image	Rotated Image
D		
E		
F		
any	(x, y)	

2. Find the slope of each side of the original image and each side of the rotated image. Record the slopes in the table.

	Original Image	Rotated Image
Slope DE		
Slope EF		
Slope DF		
any	m	

3. Do you notice a pattern between the ordered pairs in the original image and the rotated image? If so, describe the pattern. Do you notice any pattern in the slope of the original image and the slope of the rotated image? If so, describe the pattern.

On a piece of tracing paper, plot these points to create the vertices of quadrilateral ABCD.
A (2, -1), B (2, -7), C (6, -7), D (6, -1)

1. Rotate the quadrilateral through the origin 90° counterclockwise. Record the vertices of the rotated image in the table.

	Original Image	Rotated Image
A		
B		
C		
D		
any	(x, y)	

2. Find the slope of each side of the original image and each side of the rotated image. Record the slopes in the table.

	Original Image	Rotated Image
Slope AB		
Slope BC		
Slope CD		
Slope AD		
any	m	

On a piece of tracing paper, plot these points to create the vertices of quadrilateral EFGH.
E (4, 0), F (2, 2), G (5, 6), H (7, 4)

1. Rotate the quadrilateral through the origin 90° counterclockwise. Record the vertices of the rotated image in the table.

	Original Image	Rotated Image
E		
F		
G		
H		
any	(x, y)	

2. Find the slope of each side of the original image and each side of the rotated image. Record the slopes in the table.

	Original Image	Rotated Image
Slope EF		
Slope FG		
Slope GH		
Slope EH		
any	m	

3. Do you notice a pattern between the ordered pairs in the original image and the rotated image? If so, describe the pattern. Do you notice any pattern in the slope of the original image and the slope of the rotated image? If so, describe the pattern.

Activity 2: 180° Rotation

For each of the problems in Activity 2, reattach to the cardboard the piece of tracing paper from activity 1 that corresponds to the given shape.

Triangle ABC: A (-2, 1), B (-2, 7), C (-6, 1)

1. Rotate the triangle through the origin 180° counterclockwise. Record the vertices of the rotated image in the table.

	Original Image	Rotated Image
A		
B		
C		
any	(x, y)	

2. Find the slope of each side of the original image and each side of the rotated image. Record the slopes in the table.

	Original Image	Rotated Image
Slope AB		
Slope BC		
Slope AC		
any	m	

Triangle DEF: D (-7, 0), E (-5, -3), F (-2, -1)

1. Rotate the triangle through the origin 180° counterclockwise. Record the vertices of the rotated image in the table.

	Original Image	Rotated Image
D		
E		
F		
any	(x, y)	

2. Find the slope of each side of the original image and each side of the rotated image. Record the slopes in the table.

	Original Image	Rotated Image
Slope DE		
Slope EF		
Slope DF		
any	m	

3. Do you notice a pattern between the ordered pairs in the original image and the rotated image? If so, describe the pattern. Do you notice any pattern in the slope of the original image and the slope of the rotated image? If so, describe the pattern.

Quadrilateral ABCD: A (2, -1), B (2, -7), C (6, -7), D (6, -1)

1. Rotate the quadrilateral through the origin 180° counterclockwise. Record the vertices of the rotated image in the table.

	Original Image	Rotated Image
A		
B		
C		
D		
any	(x, y)	

2. Find the slope of each side of the original image and each side of the rotated image. Record the slopes in the table.

	Original Image	Rotated Image
Slope AB		
Slope BC		
Slope CD		
Slope AD		
any	m	

Quadrilateral EFGH: E (4, 0), F (2, 2), G (5, 6), H (7, 4)

1. Rotate the quadrilateral through the origin 180° counterclockwise. Record the vertices of the rotated image in the table.

	Original Image	Rotated Image
E		
F		
G		
H		
any	(x, y)	

2. Find the slope of each side of the original image and each side of the rotated image. Record the slopes in the table.

	Original Image	Rotated Image
Slope EF		
Slope FG		
Slope GH		
Slope EH		
any	m	

3. Do you notice a pattern between the ordered pairs in the original image and the rotated image? If so, describe the pattern. Do you notice any pattern in the slope of the original image and the slope of the rotated image? If so, describe the pattern.

Activity 3: 270° Rotation

For each of the problems in Activity 3, reattach to the cardboard the piece of tracing paper from activity 1 that corresponds to the given shape.

Triangle ABC: A (-2, 1), B (-2, 7), C (-6, 1)

1. Rotate the triangle through the origin 270° counterclockwise. Record the vertices of the rotated image in the table.

	Original Image	Rotated Image
A		
B		
C		
any	(x, y)	

2. Find the slope of each side of the original image and each side of the rotated image. Record the slopes in the table.

	Original Image	Rotated Image
Slope AB		
Slope BC		
Slope AC		
any	m	

Triangle DEF: D (-7, 0), E (-5, -3), F (-2, -1)

1. Rotate the triangle through the origin 270° counterclockwise. Record the vertices of the rotated image in the table.

	Original Image	Rotated Image
D		
E		
F		
any	(x, y)	

2. Find the slope of each side of the original image and each side of the rotated image. Record the slopes in the table.

	Original Image	Rotated Image
Slope DE		
Slope EF		
Slope DF		
any	m	

3. Do you notice a pattern between the ordered pairs in the original image and the rotated image? If so, describe the pattern. Do you notice any pattern in the slope of the original image and the slope of the rotated image? If so, describe the pattern.

Quadrilateral ABCD: A (2, -1), B (2, -7), C (6, -7), D (6, -1)

1. Rotate the quadrilateral through the origin 270° counterclockwise. Record the vertices of the rotated image in the table.

	Original Image	Rotated Image
A		
B		
C		
D		
any	(x, y)	

2. Find the slope of each side of the original image and each side of the rotated image. Record the slopes in the table.

	Original Image	Rotated Image
Slope AB		
Slope BC		
Slope CD		
Slope AD		
any	m	

Quadrilateral EFGH: E (4, 0), F (2, 2), G (5, 6), H (7, 4)

1. Rotate the quadrilateral through the origin 270° counterclockwise. Record the vertices of the rotated image in the table.

	Original Image	Rotated Image
E		
F		
G		
H		
any	(x, y)	

2. Find the slope of each side of the original image and each side of the rotated image. Record the slopes in the table.

	Original Image	Rotated Image
Slope EF		
Slope FG		
Slope GH		
Slope EH		
any	m	

3. Do you notice a pattern between the ordered pairs in the original image and the rotated image? If so, describe the pattern. Do you notice any pattern in the slope of the original image and the slope of the rotated image? If so, describe the pattern.

Activity 4: 360° Rotation

For each of the problems in Activity 4, reattach to the cardboard the piece of tracing paper from activity 1 that corresponds to the given shape.

Triangle ABC: A (-2, 1), B (-2, 7), C (-6, 1)

1. Rotate the triangle through the origin 360° counterclockwise. Record the vertices of the rotated image in the table.

	Original Image	Rotated Image
A		
B		
C		
any	(x, y)	

2. Find the slope of each side of the original image and each side of the rotated image. Record the slopes in the table.

	Original Image	Rotated Image
Slope AB		
Slope BC		
Slope AC		
any	m	

Triangle DEF: D (-7, 0), E (-5, -3), F (-2, -1)

1. Rotate the triangle through the origin 360° counterclockwise. Record the vertices of the rotated image in the table.

	Original Image	Rotated Image
D		
E		
F		
any	(x, y)	

2. Find the slope of each side of the original image and each side of the rotated image. Record the slopes in the table.

	Original Image	Rotated Image
Slope DE		
Slope EF		
Slope DF		
any	m	

3. Do you notice a pattern between the ordered pairs in the original image and the rotated image? If so, describe the pattern. Do you notice any pattern in the slope of the original image and the slope of the rotated image? If so, describe the pattern.

Quadrilateral ABCD: A (2, -1), B (2, -7), C (6, -7), D (6, -1)

1. Rotate the quadrilateral through the origin 360° counterclockwise. Record the vertices of the rotated image in the table.

	Original Image	Rotated Image
A		
B		
C		
D		
any	(x, y)	

2. Find the slope of each side of the original image and each side of the rotated image. Record the slopes in the table.

	Original Image	Rotated Image
Slope AB		
Slope BC		
Slope CD		
Slope AD		
any	m	

Quadrilateral EFGH: E (4, 0), F (2, 2), G (5, 6), H (7, 4)

1. Rotate the quadrilateral through the origin 360° counterclockwise. Record the vertices of the rotated image in the table.

	Original Image	Rotated Image
E		
F		
G		
H		
any	(x, y)	

2. Find the slope of each side of the original image and each side of the rotated image. Record the slopes in the table.

	Original Image	Rotated Image
Slope EF		
Slope FG		
Slope GH		
Slope EH		
any	m	

3. Do you notice a pattern between the ordered pairs in the original image and the rotated image? If so, describe the pattern. Do you notice any pattern in the slope of the original image and the slope of the rotated image? If so, describe the pattern.

For the following problems, attach a piece of grid paper to the cardboard using tape. Draw the *x*- and *y*- axes on the grid paper. Place a piece of tracing paper over the grid paper and secure it to the cardboard with the pushpin through the origin. Mark the *x*- and *y*- axes on the tracing paper. Plot the given points to create the endpoints or vertices of a shape and label with the corresponding letters.
When the directions say to change shapes, remove the tracing paper and replace it with another piece of tracing paper. Save the tracing paper from the previous shape (you will use it in subsequent activities). Mark the *x*- and *y*- axes on the new piece of tracing paper and repeat the directions with the new shape.

Activity 1: 90° Rotation

On a piece of tracing paper, plot these points to create the endpoints of segment AB.
A (1,5), B (3, 2)

1. Rotate the segment through the origin 90° counterclockwise. Record the endpoints of the rotated image in the table.

	Original Image	Rotated Image
A		
B		
any		

2. Find the slope of the original image and the slope of the rotated image. Record the slopes in the table.

	Original Image	Rotated Image
slope		
any		

On a piece of tracing paper, plot these points to create the endpoints of segment CD.

C (-2,1), D (0,0)

1. Rotate the segment through the origin 90° counterclockwise. Record the endpoints of the rotated image in the table.

	Original Image	Rotated Image
C		
D		
any		

2. Find the slope of the original image and the slope of the rotated image. Record the slopes in the table.

	Original Image	Rotated Image
slope		
any		

On a piece of tracing paper, plot these points to create the endpoints of segment EF.

E (1,0), F (0, -1)

1. Rotate the segment through the origin 90° counterclockwise. Record the endpoints of the rotated image in the table.

	Original Image	Rotated Image
E		
F		
any		

2. Find the slope of the original image and the slope of the rotated image. Record the slopes in the table.

	Original Image	Rotated Image
slope		
any		

3. Do you notice a pattern between the ordered pairs in the original image and the rotated image? If so, describe the pattern. Do you notice any pattern in the slope of the original image and the slope of the rotated image? If so, describe the pattern.

Activity 2: 180° Rotation

For each of the problems in Activity 2, reattach to the cardboard the piece of tracing paper from activity 1 that corresponds to the given shape.

Segment AB: A (1,5), B (3, 2)

1. Rotate the segment through the origin 180° counterclockwise. Record the endpoints of the rotated image in the table.

	Original Image	Rotated Image
A		
B		
any		

2. Find the slope of the original image and the slope of the rotated image. Record the slopes in the table.

	Original Image	Rotated Image
slope		
any		

Segment CD: (-2,1), D (0,0)

1. Rotate the segment through the origin 180° counterclockwise. Record the endpoints of the rotated image in the table.

	Original Image	Rotated Image
C		
D		
any		

2. Find the slope of the original image and the slope of the rotated image. Record the slopes in the table.

	Original Image	Rotated Image
slope		
any		

Segment EF: E (1,0), F (0,-1)

1. Rotate the segment through the origin 180° counterclockwise. Record the endpoints of the rotated image in the table.

	Original Image	Rotated Image
E		
F		
any		

2. Find the slope of the original image and the slope of the rotated image. Record the slopes in the table.

	Original Image	Rotated Image
slope		
any		

3. Do you notice a pattern between the ordered pairs in the original image and the rotated image? If so, describe the pattern. Do you notice any pattern in the slope of the original image and the slope of the rotated image? If so, describe the pattern.

Activity 3: 270° Rotation

For each of the problems in Activity 3, reattach to the cardboard the piece of tracing paper from activity 1 that corresponds to the given shape.

Segment AB: A (1,5), B (3, 2)

1. Rotate the segment through the origin 270° counterclockwise. Record the endpoints of the rotated image in the table.

	Original Image	Rotated Image
A		
B		
any		

2. Find the slope of the original image and the slope of the rotated image. Record the slopes in the table.

	Original Image	Rotated Image
slope		
any		

Segment CD: C (-2,1), D (0,0)

1. Rotate the segment through the origin 270° counterclockwise. Record the endpoints of the rotated image in the table.

	Original Image	Rotated Image
C		
D		
any		

2. Find the slope of the original image and the slope of the rotated image. Record the slopes in the table.

	Original Image	Rotated Image
slope		
any		

Segment EF: E (1,0), F (0, -1)

1. Rotate the segment through the origin 270° counterclockwise. Record the endpoints of the rotated image in the table.

	Original Image	Rotated Image
E		
F		
any		

2. Find the slope of the original image and the slope of the rotated image. Record the slopes in the table.

	Original Image	Rotated Image
slope		
any		

3. Do you notice a pattern between the ordered pairs in the original image and the rotated image? If so, describe the pattern. Do you notice any pattern in the slope of the original image and the slope of the rotated image? If so, describe the pattern.

Activity 4: 360° Rotation

For each of the problems in Activity 4, reattach to the cardboard the piece of tracing paper from activity 1 that corresponds to the given shape.

Segment AB: A (1,5), B (3, 2)

1. Rotate the segment through the origin 360° counterclockwise. Record the endpoints of the rotated image in the table.

	Original Image	Rotated Image
A		
B		
any		

2. Find the slope of the original image and the slope of the rotated image. Record the slopes in the table.

	Original Image	Rotated Image
slope		
any		

Segment CD: C (-2,1), D (0,0)

1. Rotate the segment through the origin 360° counterclockwise. Record the endpoints of the rotated image in the table.

	Original Image	Rotated Image
C		
D		
any		

2. Find the slope of the original image and the slope of the rotated image. Record the slopes in the table.

	Original Image	Rotated Image
slope		
any		

Segment EF: E (1,0), F (0, -1)

1. Rotate the segment through the origin 360° counterclockwise. Record the endpoints of the rotated image in the table.

	Original Image	Rotated Image
E		
F		
any		

2. Find the slope of the original image and the slope of the rotated image. Record the slopes in the table.

	Original Image	Rotated Image
slope		
any		

3. Do you notice a pattern between the ordered pairs in the original image and the rotated image? If so, describe the pattern. Do you notice any pattern in the slope of the original image and the slope of the rotated image? If so, describe the pattern.