Name_____

Rotations

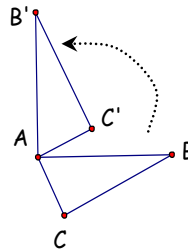Rotations   Rotations   Rotations   Rotations

Rotations are exactly as you would expect: a transformation that turns an image around a given point. When we are graphing, that point will always be the origin (0,0).
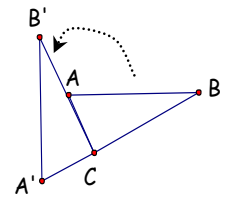
We usually rotate in the same direction that we number the quadrants: _____. If you are asked to rotate clockwise, find the equivalent rotation counterclockwise. (More later…)
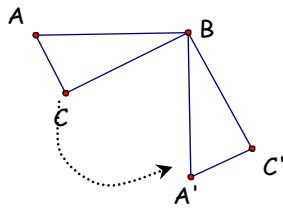
ΔABC is rotated 90° about point B

ΔABC is rotated 90° about point A

ΔABC is rotated 90° about point C

Rules for rotating _____ about the origin:

Rule	Abbreviation	Transformation
Rotation of 90° about the origin	$R_{90°}$	(x, y) →
Rotation of 180° about the origin	$R_{180°}$	(x, y) →
Rotation of 270° about the origin	$R_{270°}$	(x, y) →
Rotation of 360° about the origin	$R_{360°}$	(x, y) →

Please keep in mind:

A rotation of 270° COUNTERCLOCKWISE is equivalent to a rotation of _____!
A rotation of 360° in either direction maps each preimage onto itself.

Example 1:

Find the coordinates of ΔA(2, 1), B(3, -1), C(-4, 0) after a rotation of 90° counterclockwise about the origin.

Write your questions here!

Example 2:
Find the coordinates of ΔD(-2, 5), E(0, 4), F(-4, -3) after a rotation of 180° counterclockwise about the origin.

Example 3:
Find the coordinates of ΔG(4, -7), H(-2, 4), F(-1, 0) after a rotation of 90° clockwise about the origin.

Example 4:

   a.   Graph trapezoid TRAP where T(0, 4), R(-2,1), A(-5,1), and P(-5,4).

    b.   Graph T'R'A'P', the image of TRAP after $R_{270°}$.

    c.   Graph kite KITE where K(-3, -3), I(-1, -3), T(-1, -1) and E(-4, 0).

    d.   Graph K'I'T'E', the image of KITE after $R_{90°}$.
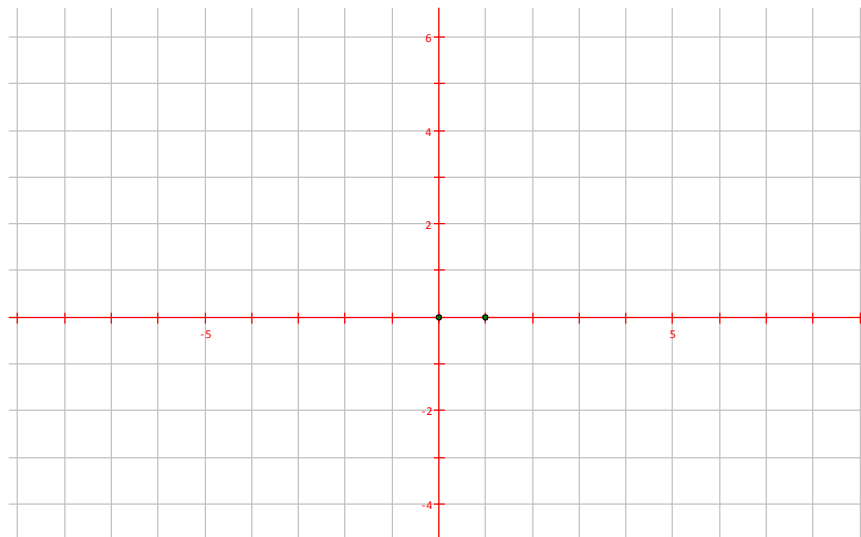
Symmetry

An object has _____ if there is a center point around which the object is rotated a certain number of degrees and the object looks the same.

Examples:

Order 4   Order 2   Order 3   Order 1

no rotational symmetry

Signs may possess rotational symmetry.
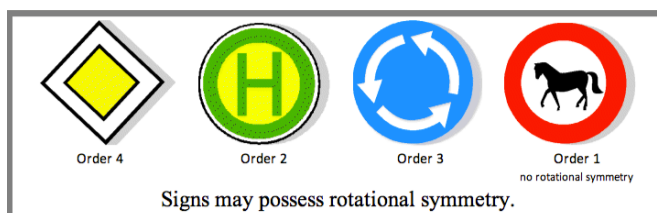
Write your questions here!

Which of the following letters have ***rotational symmetry***?

Which have ***reflectional symmetry***?

A B C D E F
G H I J K L
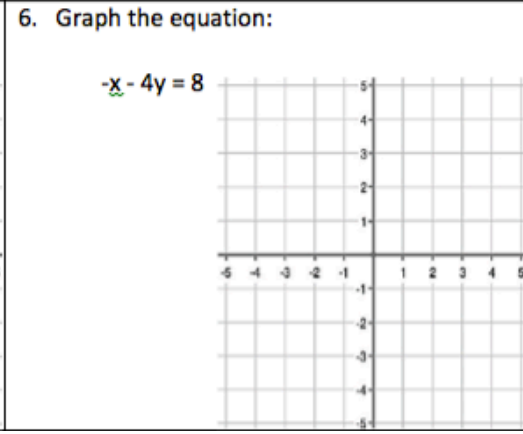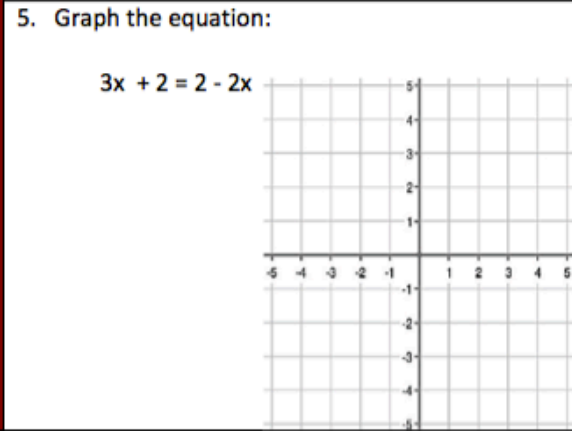M N O P Q
R S T U V W
X Y Z

Now, summarize your notes here!

_____

_____

_____

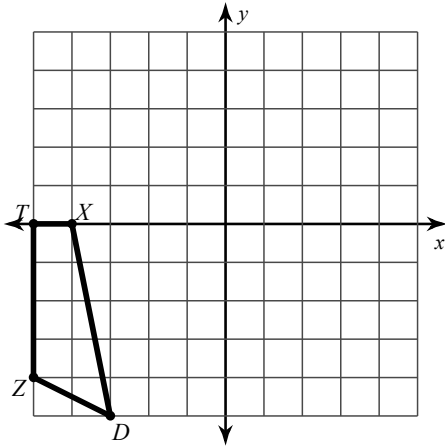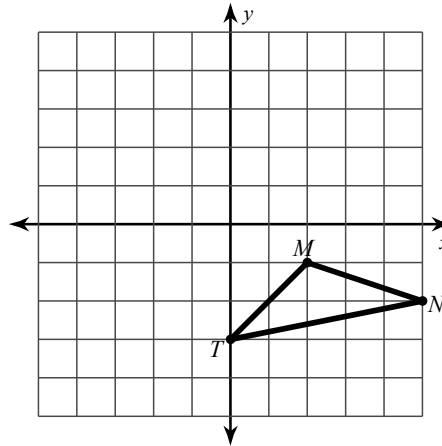| Solve each equation for x!	
1. $20 - x > 19.5$	2. $36 - 4x = -x - x$
Factor!	**Factor!**
3. $2x^2 - x - 3$	4. $(x^2 - 1)$
5. Graph the equation: $3x + 2 = 2 - 2x$	6. Graph the equation: $-x - 4y = 8$

Practice 8.3

Graph and label the image of the figure using the transformation given.

1) rotation 90° counterclockwise about the origin

2) rotation 180° about the origin

Find the coordinates of the vertices of each figure after the given transformation.

3) rotation 90° clockwise about the origin
$G(0, -3), B(3, -1), U(1, -5)$

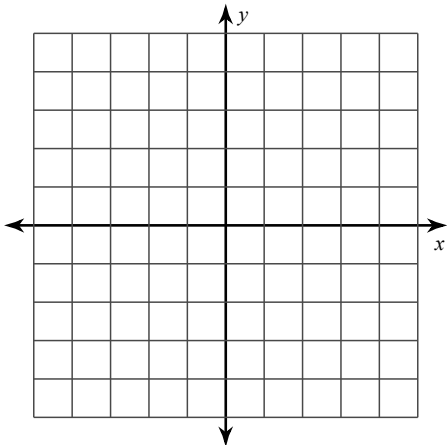4) rotation 90° clockwise about the origin
$R(1, 1), F(5, 4), H(3, 1)$
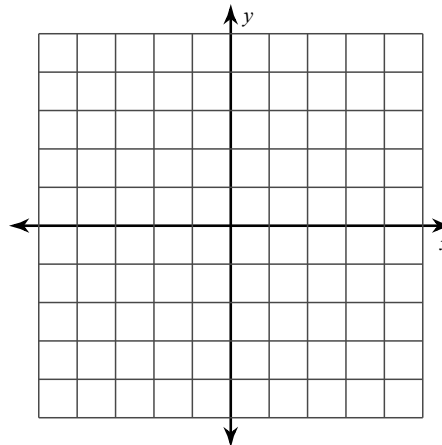
5) rotation 180° about the origin
$I(1, 3), F(5, 5), C(4, 2)$

6) rotation 90° counterclockwise about the origin
$I(-5, 1), X(-4, 5), Q(-2, 0)$

Graph the image and the preimage of the figure using the transformation given.

7) rotation 90° counterclockwise about the origin
$G(0, -3), B(-1, 1), J(3, 0)$

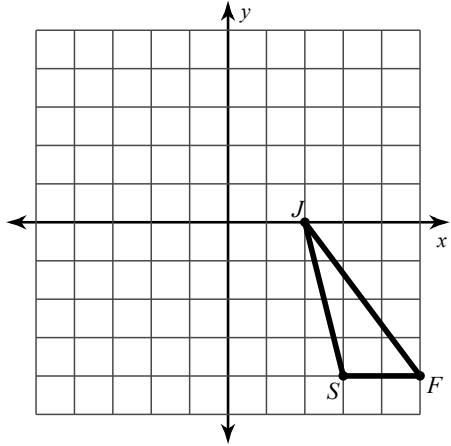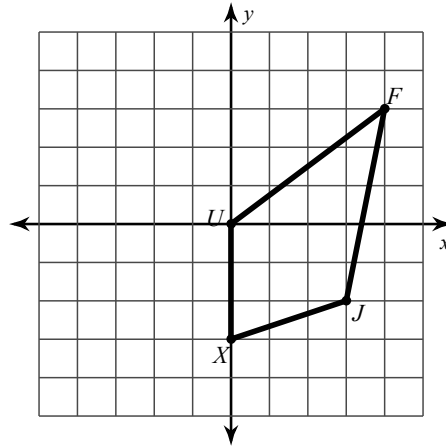8) rotation 180° about the origin
$D(-5, 2), S(-3, 3), Q(-3, 2)$

Graph the image and the preimage of the figure using the transformation given.
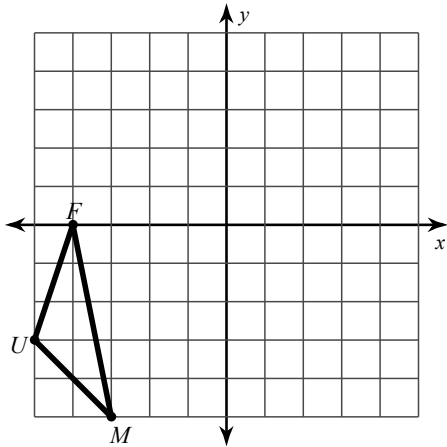
9) rotation 90° clockwise about the origin
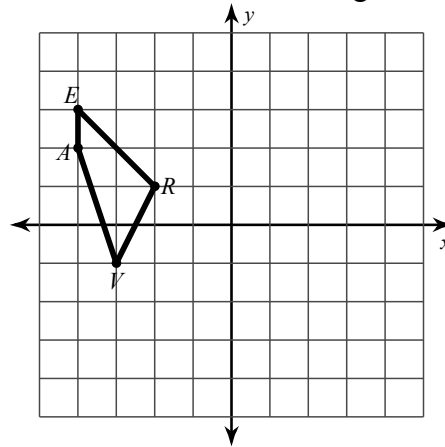
10) rotation 90° counterclockwise about the origin

Find the coordinates of the vertices of each figure after the given transformation. Then graph the reflection.

11) rotation 90° clockwise about the origin
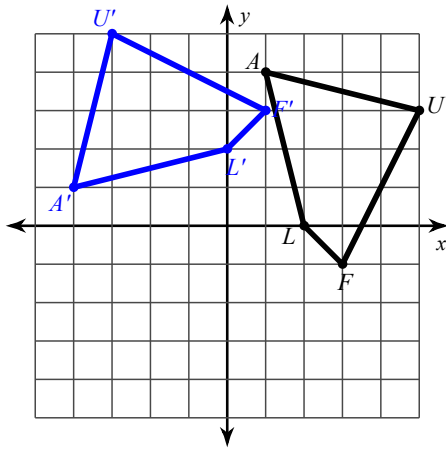
12) rotation 180° about the origin

13) rotation 90° counterclockwise about the origin
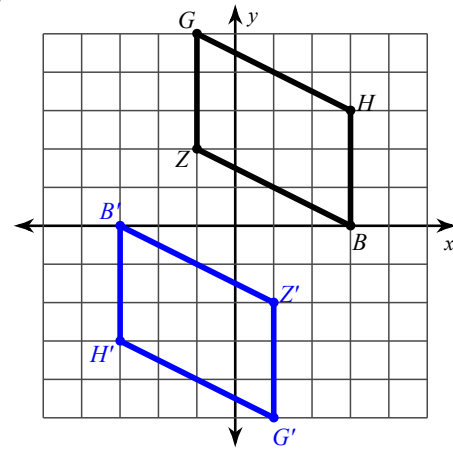$U(2, -4)$, $I(0, -1)$, $C(2, -1)$, $E(5, -3)$

14) rotation 180° about the origin
$F(4, -3)$, $D(3, 0)$, $V(5, 0)$, $E(5, -4)$

Tell the type of rotation that describes each transformation.

15)

16)

17) $F(1, 0)$, $N(1, 3)$, $V(2, 4)$, $U(3, 4)$

           to

  $F'(-1, 0)$, $N'(-1, -3)$, $V'(-2, -4)$, $U'(-3, -4)$

18) $Q(-3, 1)$, $A(-4, 3)$, $I(-2, 4)$, $E(0, 4)$

           to

  $Q'(1, 3)$, $A'(3, 4)$, $I'(4, 2)$, $E'(4, 0)$

8.3 Application and Extension

1. Find the coordinates of $\Delta C(-2, 3)$, $A(-3, 4)$, $T(-2, 0)$ after a rotation of $90°$ counterclockwise about the origin.

2. Graph the image and the preimage of the figure after a rotation of $90°$ clockwise about the origin.

3. Name 3 letters that do not have rotational symmetry.

4. Name 3 letters that do have rotational symmetry.