Analytic Geometry February 2, 2016

# Describing Rigid Motions and Predicting the Effects

## EQ: What are the differences between rigid and non-rigid motions?

MCC9-12.G.CO.6 Use geometric descriptions of rigid motions to transform figures and to predict the effect of a given rigid motion on a given figure; given two figures, use the definition of congruence in terms of rigid motions to decide if they are congruent.

Feb 10-4:01 PM

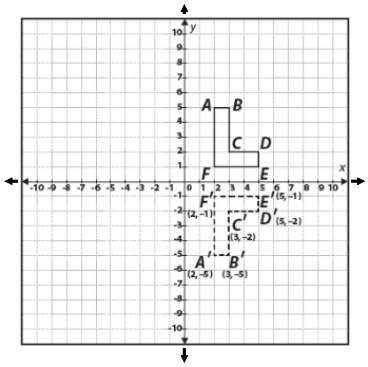
## Warm-up:

Before the digital age, printing presses were used to create text products such as newspapers, brochures, and any other mass-produced, printed material. Printing presses used printing blocks that were the reflection of the image to be printed. Some antique collectors seek out hand-carved printing blocks. An antique poster of the printed letter "L" was created using a printing block. The "L" has the coordinates A (2,5), B (3,5), C (3,2), D (5,2), E (5,1), and F (2,1). Use this information to solve the following problems.

1) What are the coordinates of the printing block through $r_{xaxis}$?

A' (2, -5), B' (3, -5), C' (3, -2), D' (5, -2), E' (5, -1), F' (2, -1)

2) Graph the preimage and the image.

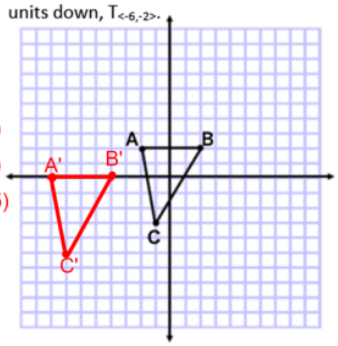



Feb 14-10:05 AM

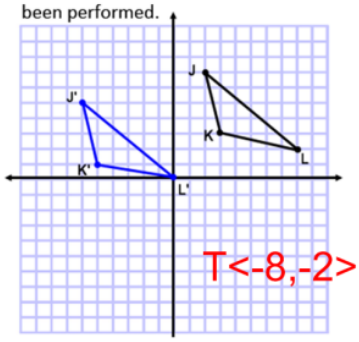
## Homework Answers

1) Translate ΔABC 6 units to the left and 2 units down, $T_{<-6,-2>}$.

A'(-8,0)
B'(-4,0)
C'(-7,-5)

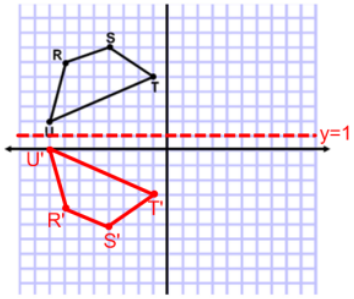



2) Determine the transformation that has been performed.




T<-8,-2>

3) Reflect figure RSTU over the line y = 1, $R_{y=1}$.




Sep 24-7:07 AM

## Review of Key Concepts:

Rigid motions are transformations that don't affect an object's shape and size.

Examples of rigid motions are translations, reflections, and rotations.

Transformations that are non-rigid motions includes dilations, stretches, & compressions.

Sep 22-1:41 PM

**Rotations** are sometimes called turns and they move all points of a figure along a circular arc about a point. In a rotation, the orientation is changed and the point of rotation can lie on, inside, or outside the figure and is the fixed location that the object is turned. The angle of rotation is the measure of the angle created by the preimage vertex to the point of rotation to the image vertex.

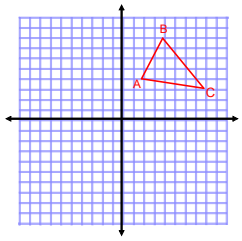
Rotating a Figure Given a Point and Angle of Rotation

| 90° Rotation | 180° Rotation |
|---|---|
| Determine in which quadrant the image will be. | Determine in which quadrant the image will be. |
| Draw segments connecting the vertices of the preimage to the x-axis. Determine the x value of each segment and the length of the segment. | Draw segments connecting the vertices of the preimage to the x-axis. Determine the x value of each segment and the length of the segment. |
| Plot points on the y-axis next to the appropriate Quadrant (signs may change). From these points, draw horizontal segments of the same length as found in step 2. | Plot points on the opposite side of the x-axis (signs will change). From these points, draw vertical segments of the same length as found in step 2. |
| Plot points and connect to form the image. | Plot points and connect to form the image. |

Feb 10-4:14 PM

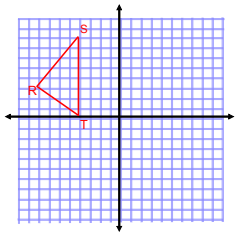
## Examples of Rotations

1. Rotate ΔABC about the origin 90° clockwise.
$r_{(90°, O)}(\Delta ABC) = \Delta A'B'C'$



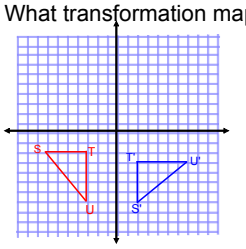

Vertices of the image:
A' = (4, -2)
B' = (8, -4)
C' = (3, -8)

2. Rotate ΔRST 180° about the origin. $r_{(180, O)}(\Delta RST) = \Delta R'S'T'$




Vertices of the image:
R' = (8, -3)
S' = (4, -8)
T' = (4, 0)

3. What transformation maps ΔSTU onto ΔS'T'U'?



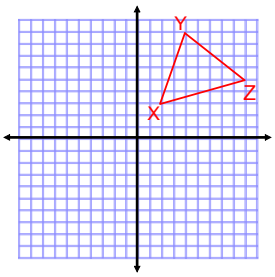

| Preimage | Image |
|---|---|
| S = (-7, -2) | S' = (2, -7) |
| T = (-3, -2) | T' = (2, -3) |
| U = (-3, -7) | U' = (7, -3) |

$r^{(270°, O)}(\Delta STU) = \Delta S'T'U'$

Sep 13-8:59 AM

## *Pull it all together!*

1. Translate the figure left 5 units and down 4 units, then reflect the image over y = -2. $T_{<-5, -4>}$ $R_{y=-2}$



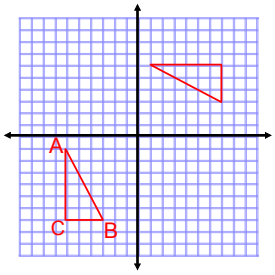

Vertices of the image:

X' = (-3, -3)

Y' = (-1, -9)

Z' = (4, -5)

2. Reflect the triangle over the line y = -x, then rotate the figure 180°.




$R_{AB}r_{(180^\circ, O)}$

Vertices of the image:

A' = (-1, -6)

B' = (-7, -3)

C' = (-7, -6)

Sep 15-6:00 PM

# Homework

## Worksheet

**On-line and textbook help references: p. 181 - 182**

- http://www.mathsisfun.com/geometry/transformations.html

- https://www.khanacademy.org/math/geometry/transformations

- http://www.mathplayground.com/ShapeMods/ShapeMods.html

Aug 3 - 1:24 PM