William O’Brien

Coordinating Seminar Lesson - Discovering Relationships Using Transformations

**Discovering Relationships Using Transformations**

**Graph the following points and connect the points to create a figure:**

**A=(1,1) B=(4,1) C=(4,5)**

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**Directions:** Once you have created your figure on your **Coordinate Grid Worksheet** perform the following transformations, record their points, and answer the following questions:

**Reflection**

*Reflect Over the Y-Axis*

Ay = \_\_\_\_\_\_\_\_\_\_ By = \_\_\_\_\_\_\_\_\_\_ Cy = \_\_\_\_\_\_\_\_\_\_

*Reflect Over the X-Axis*

Ax = \_\_\_\_\_\_\_\_\_\_ Bx = \_\_\_\_\_\_\_\_\_\_ Cx = \_\_\_\_\_\_\_\_\_\_

*Reflect Over the Origin*

Ao = \_\_\_\_\_\_\_\_\_\_ Bo = \_\_\_\_\_\_\_\_\_\_ Co = \_\_\_\_\_\_\_\_\_\_

**Rotations – Clockwise ONLY**

*Rotate 90 Degrees*

A90 = \_\_\_\_\_\_\_\_\_\_ B90 = \_\_\_\_\_\_\_\_\_\_ C90 = \_\_\_\_\_\_\_\_\_\_

*Rotate 180 Degrees*

A180 = \_\_\_\_\_\_\_\_\_\_ B180 = \_\_\_\_\_\_\_\_\_\_ C180 = \_\_\_\_\_\_\_\_\_\_

*Rotate 270 Degrees*

A270 = \_\_\_\_\_\_\_\_\_\_ B270 = \_\_\_\_\_\_\_\_\_\_ C270 = \_\_\_\_\_\_\_\_\_\_

*Rotate 360 Degrees*

A360 = \_\_\_\_\_\_\_\_\_\_ B360 = \_\_\_\_\_\_\_\_\_\_ C360 = \_\_\_\_\_\_\_\_\_\_

What geometric figure did we create and are now performing transformations on?

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At what degree measure(s) is the rotated figure identical to the original?

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At what degree measure is the rotated figure and the reflection over the origin identical to each other?

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**Dilations**

*Dilate the original geometric figure,* ***ABC****, by a scale factor of 3*

A’ = \_\_\_\_\_\_\_\_\_\_ B’ = \_\_\_\_\_\_\_\_\_\_ C’ = \_\_\_\_\_\_\_\_\_\_

Using the distance formula $d=\sqrt{(x\_{1}-x\_{2})^{2}+ (y\_{1}-y\_{2})^{2}}$ calculate the following:

*dAB of the original figure =*

*dBC of the original figure =*

*dAC of the original figure =*

*dA’B’ of the dilated figure =*

*dB’C’ of the dilated figure =*

*dA’C’ of the dilated figure =*

Calculate the areas of the original figure, **ABC**, and dilated figure, **A’B’C’.**

Show work below:

What other measures changed by a scale factor of 3 when we performed this dilation?

At which scale measure did the area increase by between the original and dilated figures? Was it by a scale factor of 3?

What conjecture/conclusion can we derive from dilating by a scale factor of 3 and the total areas between the original and dilated figures?

**\*\*\*Lets create another figure and see if this is always the case?!?**

Is this conjecture/conclusion always the case? Why or Why Not?