Composition of Motions Practice - Honors **Name:**___________________________

For #1 – 8, there is a composition of motions. Using your algebraic rules, come up with a new rule after both transformations have taken place.

1) Translate a triangle 4 units right and 2 units up, and then reflect the triangle over the line y = x.

2) Rotate a triangle 90 degrees counter clockwise, and then dilate the figure by a scale factor of 3.

3) Translate a triangle 4 units left and 2 units down, and then reflect the triangle over the y-axis.

4) Rotate a triangle 90 degrees clockwise, and then dilate the figure by a scale factor of 1/3.

5) Translate a triangle 4 units right and 2 units down, and then reflect the triangle over the x-axis.

6) Rotate a triangle 180 degrees counter clockwise, and then dilate the figure by a scale factor of 2.

7) Translate a triangle 4 units left and 2 units up, and then reflect the triangle over the line y = x.

8) Rotate a triangle 180 degrees clockwise, and then dilate the figure by a scale factor of 1/2.

9)

Adapted from Core-Plus Mathematics Course 2, Pg. 224

a. On a coordinate grid, draw a triangle using A(-9, -2), B(-6, -1), C(-6, -3) to represent a duck foot.

b. Transform ΔABC using R_{x-axis}, followed by $T: (x, y) \rightarrow (x + 5, y)$. Label the final image ΔA'B'C'.

c. Write a coordinate rule for this composite transformation.

d. Does the order in which you apply the translation and reflection matter in this case? Why or why not?

e. Now apply the coordinate rule you gave in Part c at least three more times to ΔA'B'C'. Describe how alternate images such as images one and three, or two and four, are related.

10) Start with a new triangle. Then apply a glide reflection in which the reflection line is the y-axis. Write a coordinate rule for this glide reflection.

Composition of Motions Practice - Honors **Name:**______________________________

For #1 – 8, there is a composition of motions. Using your algebraic rules, come up with a new rule after both transformations have taken place.

1) Translate a triangle 4 units right and 2 units up, and then reflect the triangle over the line y = x.

$(x,y)\to(x+4,\ y+2)$ $(x,y)\to(y,x)$ $\boxed{(x,y)\to(y+2,\ x+4)}$

2) Rotate a triangle 90 degrees counter clockwise, and then dilate the figure by a scale factor of 3.

$(x,y)\to(-y,x)$ $(x,y)\to(3x,3y)$ $\boxed{(x,y)\to(-3y,3x)}$

3) Translate a triangle 4 units left and 2 units down, and then reflect the triangle over the y-axis.

$(x,y)\to(x-4,y-2)$ $(x,y)\to(-x,y)$ $\boxed{(x,y)\to(-x+4,y-2)}$

4) Rotate a triangle 90 degrees clockwise, and then dilate the figure by a scale factor of 1/3.

$(x,y)\to(y,-x)$ $(x,y)\to(\frac{1}{3}x,\frac{1}{3}y)$ $\boxed{(x,y)\to(\frac{y}{3},\frac{-x}{3})}$

5) Translate a triangle 4 units right and 2 units down, and then reflect the triangle over the x-axis.

$(x,y)\to(x+4,y-2)$ $(x,y)\to(x,-y)$ $\boxed{(x,y)\to(x+4,-y+2)}$

6) Rotate a triangle 180 degrees counter clockwise, and then dilate the figure by a scale factor of 2.

$(x,y)\to(-x,-y)$ $(x,y)\to(2x,2y)$ $\boxed{(x,y)\to(-2x,-2y)}$

7) Translate a triangle 4 units left and 2 units up, and then reflect the triangle over the line y = x.

$(x,y)\to(x-4,y+2)$ $(x,y)\to(y,x)$ $\boxed{(x,y)\to(y+2,x-4)}$

8) Rotate a triangle 180 degrees clockwise, and then dilate the figure by a scale factor of 1/2.

$(x,y)\to(-x,-y)$ $(x,y)\to(\frac{1}{2}x,\frac{1}{2}y)$ $\boxed{(x,y)\to(-\frac{1}{2}x,-\frac{1}{2}y)}$

9)

Adapted from Core-Plus Mathematics Course 2, Pg. 224

a. On a coordinate grid, draw a triangle using A(-9, -2), B(-6, -1), C(-6, -3) to represent a duck foot.

b. Transform ΔABC using R_{x-axis}, followed by $T: (x,y) \to (x+5, y)$. Label the final image ΔA″B″C″. $(x,y)\to(x,-y)$

c. Write a coordinate rule for this composite transformation.

$(x,y)\to(x+5,-y)$

d. Does the order in which you apply the translation and reflection matter in this case? Why or why not?

No. The translation vector is ∥ to the reflection line, so the order does NOT matter

e. Now apply the coordinate rule you gave in Part c at least three more times to ΔA'B'C'. Describe how alternate images such as images one and three, or two and four, are related. 1 + 3 are translations by 10 units

2 + 4 are translations by 10 units

10) Start with a new triangle. Then apply a glide reflection in which the reflection line is the y-axis. Write a coordinate rule for this glide reflection.