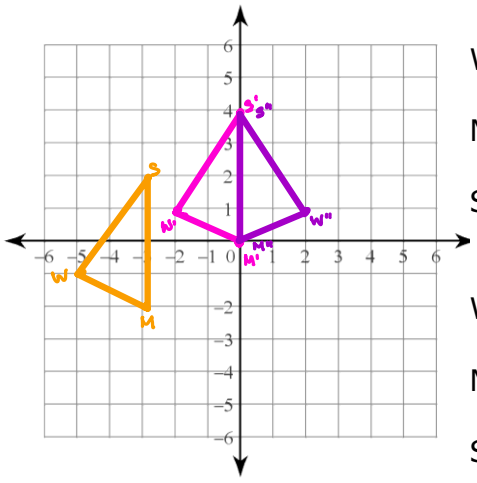
Name Key Period _____ Date _____

Multiple Transformations

When reflecting over a line, draw the line of reflection on your graph. Use a different colored pencil for each new transformation. It makes visualizing the transformations easier.

Does the order in which we do a sequence of transformations matter?

Translate ΔWMS if W(-5,-1), M(-3,-2), S(-3,2) by the rule (x,y)→(x + 3, y + 2), then reflect the image over the y-axis



W′(-2 , 1)

M′(0 , 0)

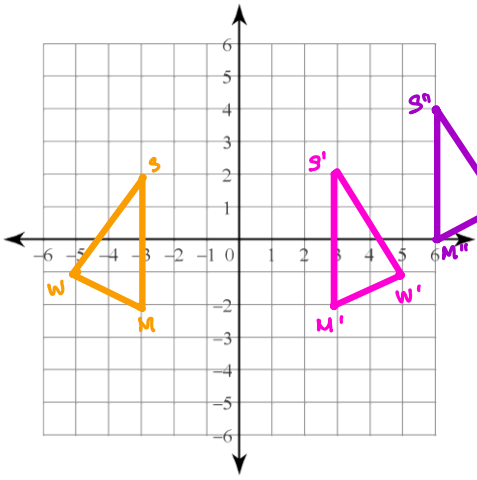
S′(0 , 4)

W″(2 , 1)

M″(0 , 0)

S″(0 , 4)

Reflect ΔWMS if W(-5,-1), M(-3,-2), S(-3,2) over the y-axis, then translate the image by the rule (x,y)→(x + 3, y + 2),



W′(5 , -1)

M′(3 , -2)

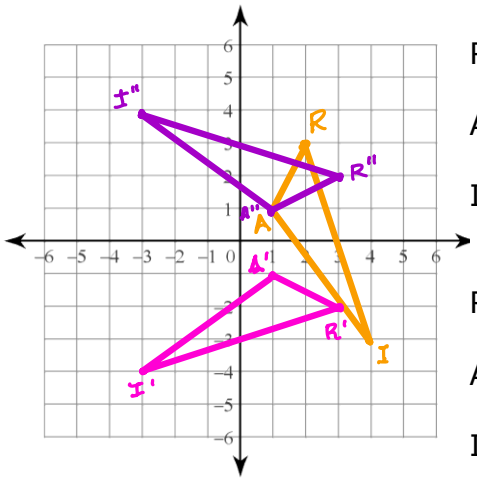
S′(3 , 2)

W″(8 , 1)

M″(6 , 0)

S″(6 , 4)

Rotate ΔRAI if R(2,3), A(1,1), I(4,-3) 90^o clockwise about the origin, then reflect the image over the x-axis.



R′(3 , -2)

A′(1 , -1)

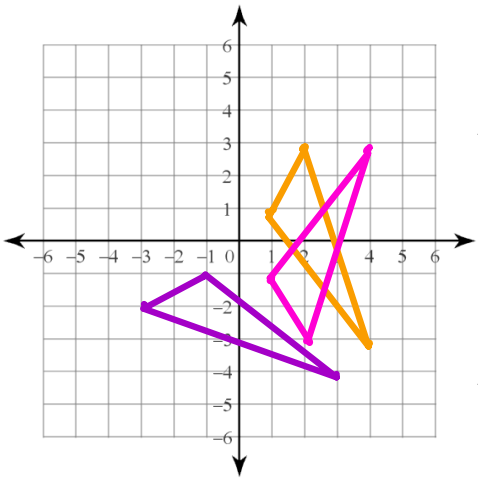
I′(-3 , -4)

R″(3 , 2)

A″(1 , 1)

I″(-3 , 4)

Reflect ΔRAI if R(2,3), A(1,1), I(4,-3)over the x-axis, then rotate the image 90^o clockwise about the origin.



R′(2 , -3)

A′(1 , -1)

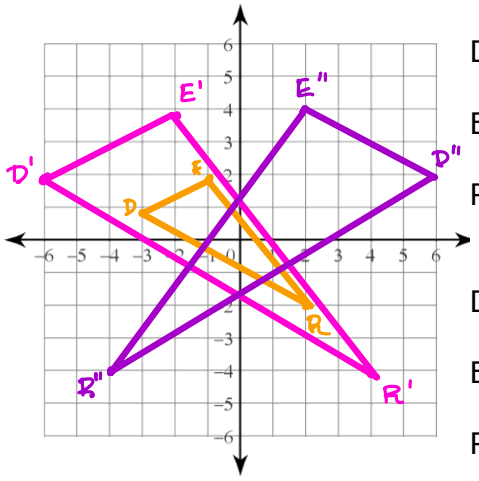
I′(4 , 3)

R″(-3 , -2)

A″(-1 , -1)

I″(3 , -4)

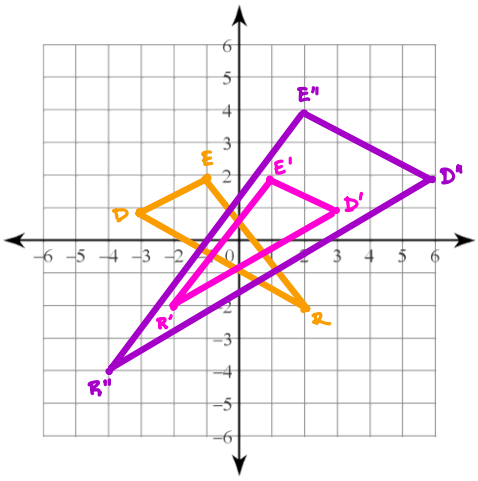
Dilate ΔDER if D(-3,1), E(-1,2), R(2,-2) by a factor of 2, then reflect the image over the y-axis.



D′(-6, 2)
E′(-2, 4)
R′(4, -4)

D″(6, 2)
E″(2, 4)
R″(-4, -4)

Reflect ΔDER if D(-3,1), E(-1,2), R(2,-2) over the y-axis. Then dilate the image by a factor of 2.



D′(3, 1)
E′(1, 2)
R′(-2, -2)

D″(6, 2)
E″(2, 4)
R″(-4, -4)

Does the order matter when performing translations and reflections? Rotations and reflections? Dilations and reflections?

Yes No Yes

Without graphing, and just by applying rules to a single point, determine if order matters when combining:

$(x,y) \to (kx, ky)$ $(x,y) \to (x+a, y+b)$

Dilations and translations:

1. $(x,y) \xrightarrow{\text{Dilation}} (kx+ky)$
2. $(kx+ky) \xrightarrow{\text{Translation}} (kx+a, ky+b)$

1. $(x,y) \xrightarrow{\text{Translation}} (x+a, y+b)$
2. $(x+a, y+b) \xrightarrow{\text{Dilation}} (kx+ka, ky+kb)$

Order DOES matter.

$(x,y) \to (y,-x)$ $(x,y) \to (x+a, y+b)$

Rotations and Translations:

1. $(x,y) \xrightarrow{\text{Rotation}} (y,-x)$
2. $(y,-x) \xrightarrow{\text{Translation}} (y+a, -x+b)$

1. $(x,y) \xrightarrow{\text{Translation}} (x+a, y+b)$
2. $(x+a, y+b) \xrightarrow{\text{Rotation}} (y+b, -x-a)$

Order DOES matter.

$(x,y) \to (kx, ky)$ $(x,y) \to (y,-x)$

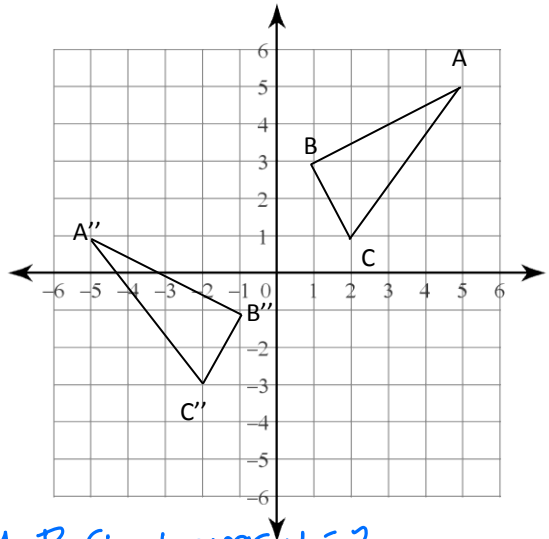
Dilations and Rotations:

1. $(x,y) \xrightarrow{\text{Dilation}} (kx, ky)$
2. $(kx, ky) \xrightarrow{\text{Rotation}} (ky, -kx)$

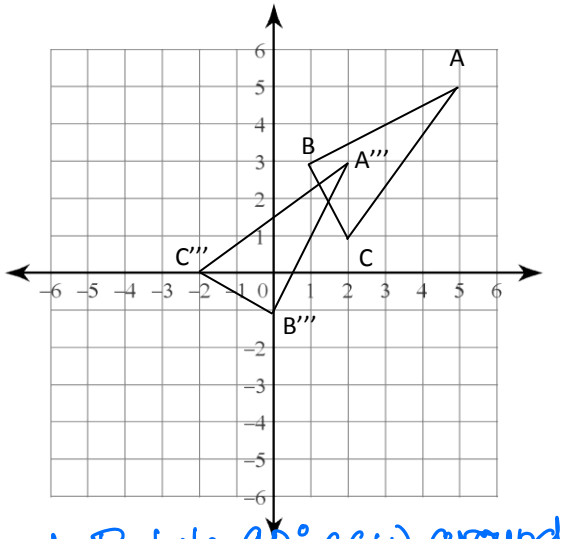
1. $(x,y) \xrightarrow{\text{Rotation}} (y,-x)$
2. $(y,-x) \xrightarrow{\text{Dilation}} (ky, -kx)$

Order does NOT matter.

What series of transformations made the following images?



1. Reflect over $y = 2$
2. Rotate 180° around (0,0)



1. Rotate 90° CCW around (0,0)
2. $(x,y) \to (x+5, y-2)$
3. Reflect over $x = 1$