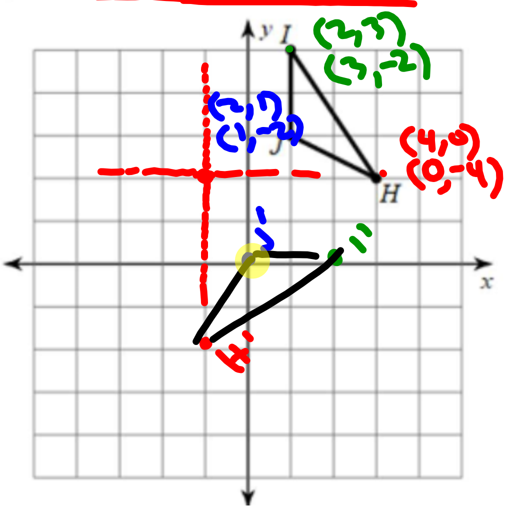
p.33, #9

Warm-up

15 January 2020

270 ccw

9) rotation 90° clockwise about the point (-1,2) $(x,y) \rightarrow (y,-x)$



$\boxed{I'(2,0) \quad J'(0,0) \quad H'(-1,-2)}$

SEQUENCE OF TRANSFORMATIONS

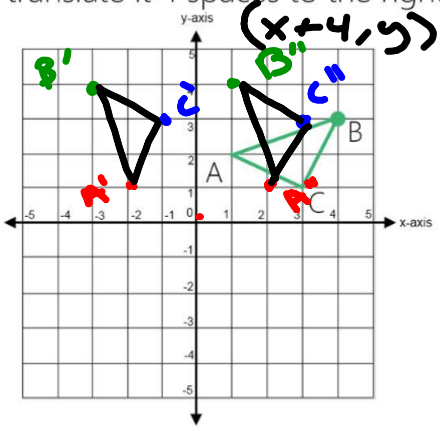
SEQUENCE OF TRANSFORMATIONS EX. 1

90° ccw

' Rotate the following figure 270 degrees clockwise,

'' translate it 4 spaces to the right.

$(x+4, y)$



$(x, y) \rightarrow (-y, x)$

$A(1,2) \rightarrow A'(-2,1) \rightarrow A''(2,1)$

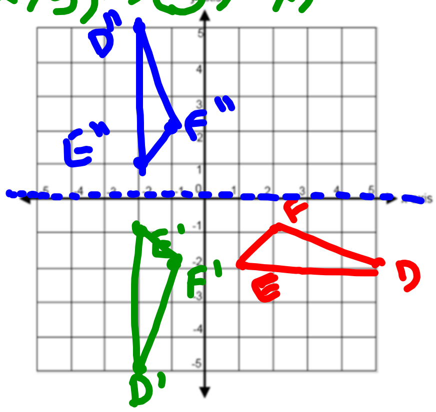
$B(4,3) \rightarrow B'(-3,4) \rightarrow B''(1,4)$

$C(3,1) \rightarrow C'(-1,3) \rightarrow C''(3,3)$

SEQUENCE OF TRANSFORMATIONS EX. 2

ΔDEF has vertices D(5, –2), E(1, –2), and F(2, –1). Rotate ΔDEF 270° CCW about the origin and then reflect it across the x-axis. $(x,y) \rightarrow (x,-y)$

$(x,y) \rightarrow (y,-x)$



$D(5,-2) \rightarrow D'(-2,-5) \rightarrow D''(-2,5)$

$E(1,-2) \rightarrow E'(-2,-1) \rightarrow E''(-2,1)$

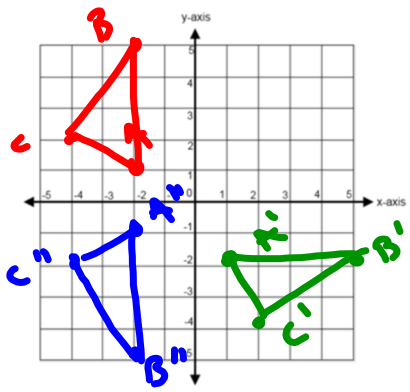
$F(2,-1) \rightarrow F'(-1,-2) \rightarrow F''(-1,2)$

SEQUENCE OF TRANSFORMATIONS EX. 3

$(x,y) \to (y,x)$ 270 ccw

Reflect ΔABC over $y=x$ then rotate it 90 degrees clockwise about the origin. $(x,y) \to (y,-x)$

A(-2, 1) B(-2,5) C(-4,2)

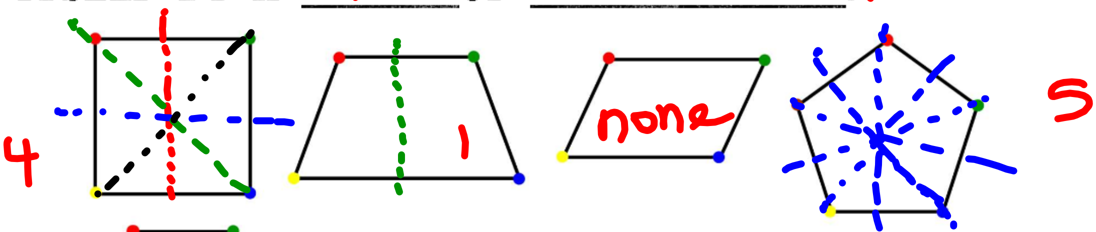


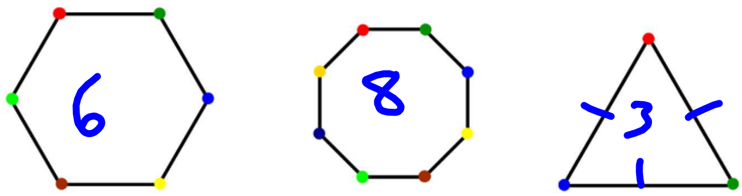
$A(-2,1) \to A'(1,-2) \to A''(-2,-1)$

$B(-2,5) \to B'(5,-2) \to B''(-2,-5)$

$C(-4,2) \to C'(2,-4) \to C''(-4,-2)$

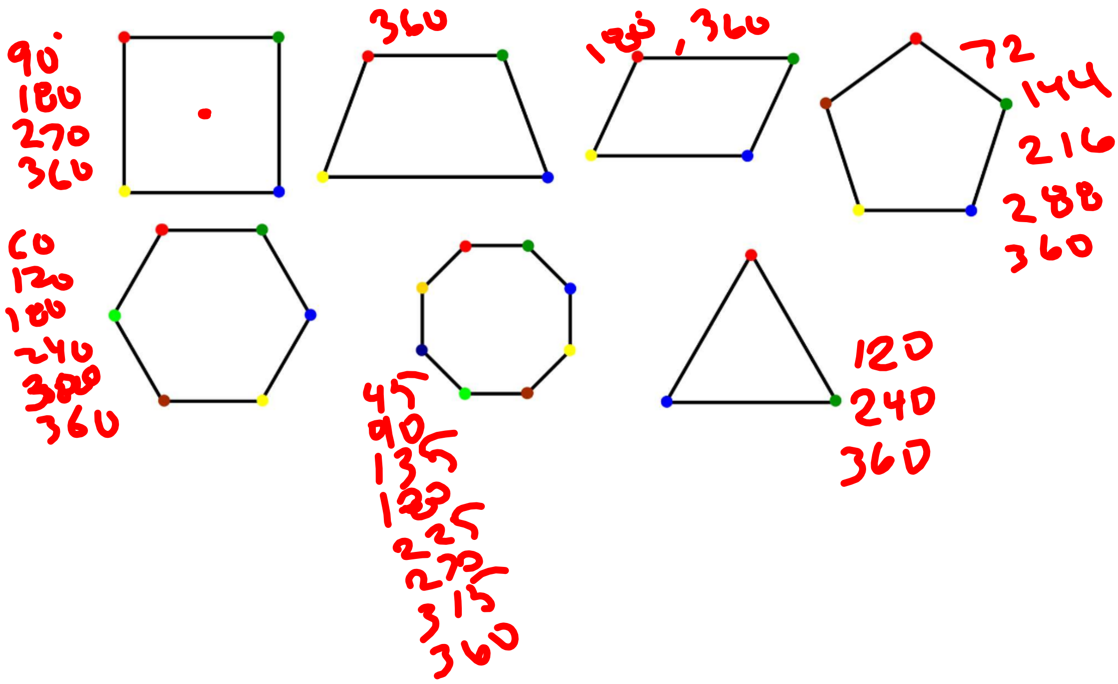
REFLECTIONAL SYMMETRY-
WHEN A FIGURE CAN BE __mapped__ ONTO ITSELF BY A __line__ OF __reflection__.





\# sides of regular polygon = lines of reflection symmetry regular polygon: $\frac{360^\circ}{n}$

ROTATIONAL SYMMETRY-
MAPPING A FIGURE onto itself **THROUGH A ROTATION ABOUT THE** center **OF THE OBJECT.**



p.33, #9

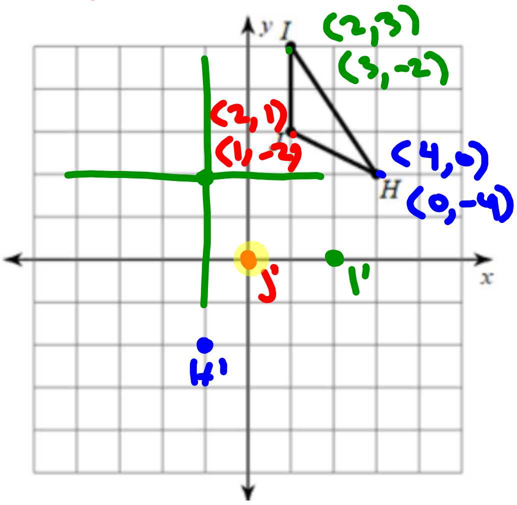
Warm-up

15 January 2020

270 ccw

9) rotation 90° clockwise about the point (-1,2)

$(x,y) \rightarrow (y,-x)$



I'(2,0)

J'(0,0)

H'(-1,-2)

SEQUENCE OF TRANSFORMATIONS

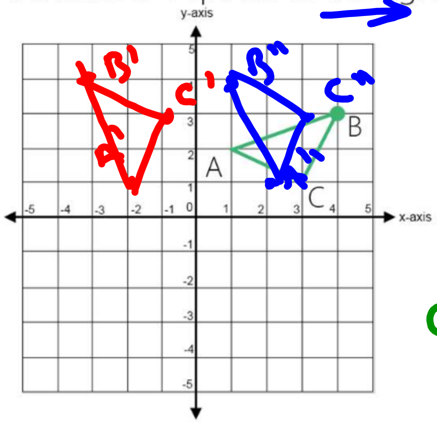
SEQUENCE OF TRANSFORMATIONS EX. 1

I Rotate the following figure 270 degrees clockwise, 90 ccw

II translate it 4 spaces to the right.

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

$(x,y) \to (x+4,y)$



$A(1,2) \to A'(-2,1) \to A''(2,1)$

$B(4,3) \to B'(-3,4) \to B''(1,4)$

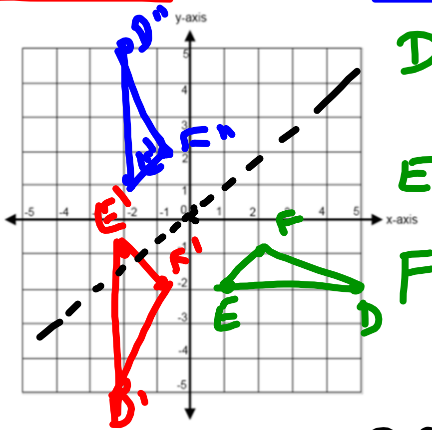
$C(3,1) \to C'(-1,3) \to C''(3,3)$

SEQUENCE OF TRANSFORMATIONS EX. 2

ΔDEF has vertices D(5, –2), E(1, –2), and F(2, –1). Rotate ΔDEF 270° CCW about the origin and then reflect it across the x-axis.

$(x,y) \rightarrow (y,-x)$

$(x,y) \rightarrow (x,-y)$



$D(5,-2) \rightarrow D'(-2,-5) \rightarrow D''(-2,5)$

$E(1,-2) \rightarrow E'(-2,-1) \rightarrow E''(-2,1)$

$F(2,-1) \rightarrow F'(-1,-2) \rightarrow F''(-1,2)$

reflect over $y=x$

$(x,y) \rightarrow (y,x)$

$(x, y) \rightarrow (\overset{x}{y}, \overset{y}{-x}) \rightarrow (y, x)$

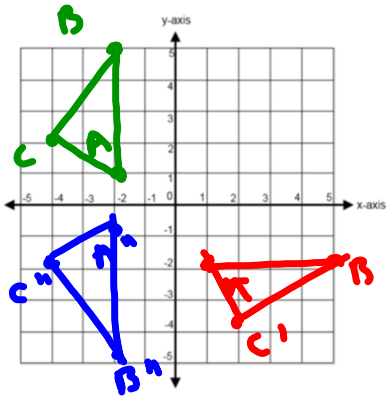
$(x, y) \rightarrow (y, x)$

SEQUENCE OF TRANSFORMATIONS EX. 3

$(x,y) \to (y,x)$ 270 ccw $(x,y) \to (y,-x)$

Reflect ΔABC over $y=x$ then rotate it 90 degrees clockwise about the origin.

A(-2, 1) B(-2,5) C(-4,2)

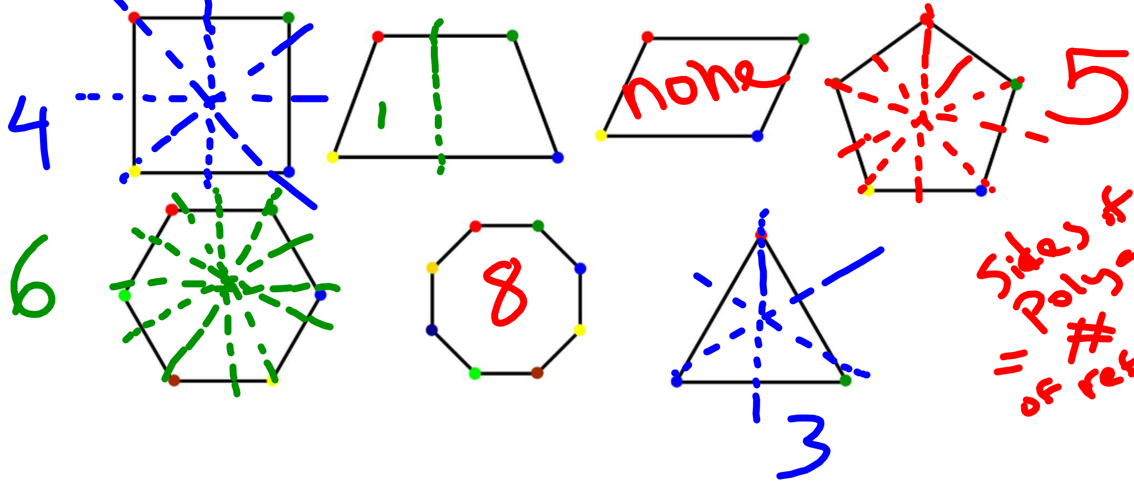


$A(-2,1) \to A'(1,-2) \to A''(-2,-1)$

$B(-2,5) \to B'(5,-2) \to B''(-2,-5)$

$C(-4,2) \to C'(2,-4) \to C''(-4,-2)$

REFLECTIONAL SYMMETRY-
WHEN A FIGURE CAN BE MAPPED **ONTO ITSELF BY A** LINE **OF** REFLECTION



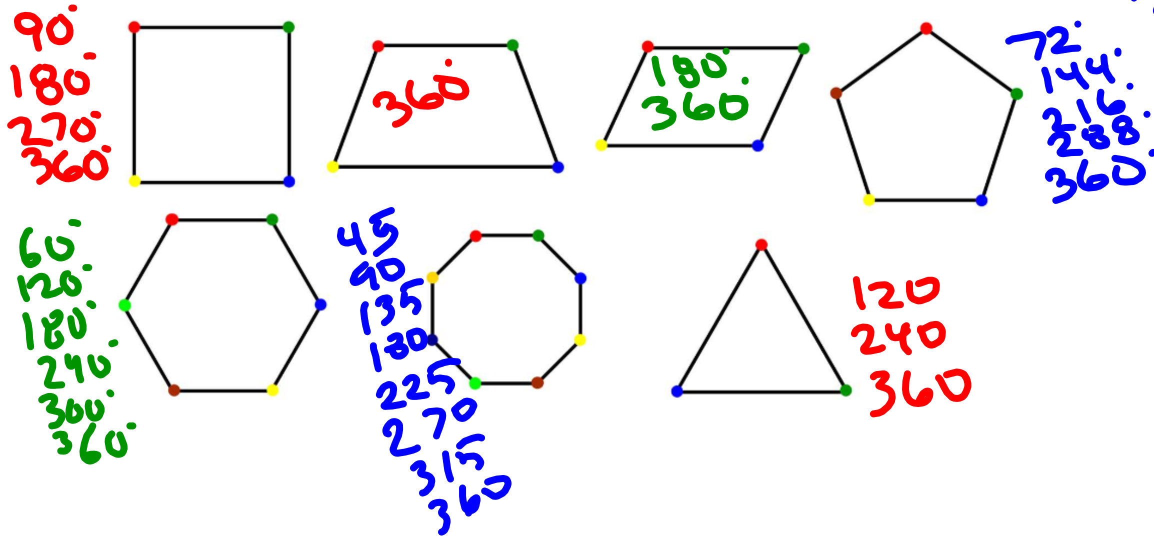
Sides of regular Polygon = # of lines of reflective symm.

$$\frac{360^\circ}{n} = \theta^\circ$$

ROTATIONAL SYMMETRY-

MAPPING A FIGURE ONTO ITSELF THROUGH A ROTATION ABOUT THE CENTER OF THE OBJECT.

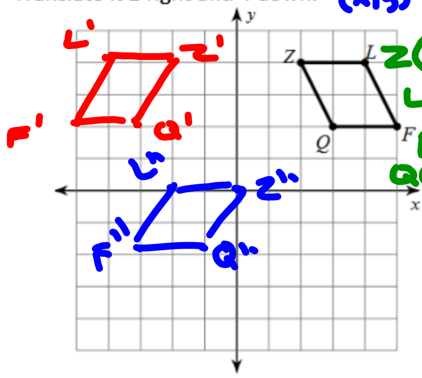
$$\frac{360^\circ}{5} = 72^\circ$$



Sequence of Transformations Name______________________________

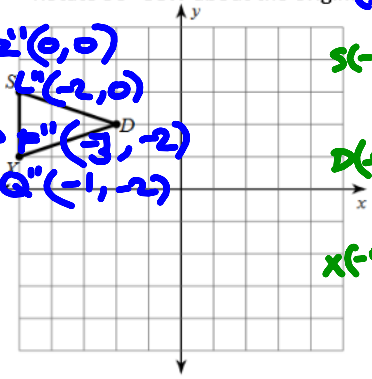
Graph the image of the figure using the sequence of transformations given.

1) Reflect across the y-axis. (x,y) → (-x,y)
Translate it 2 right and 4 down. (x,y) → (x+2, y-4)



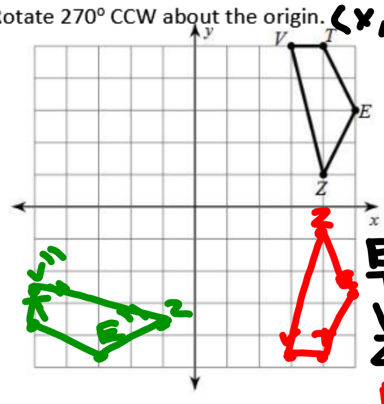
Z(2,4) → Z'(-2,4) → Z''(0,0)
L(4,4) → L'(-4,4) → L''(-2,0)
F(5,2) → F'(-5,2) → F''(-3,-2)
Q(3,2) → Q'(-3,2) → Q''(-1,-2)

2) Translate right 3 and up 1. (x,y) → (x+3, y+1)
Rotate 90° CCW about the origin. (x,y) → (-y,x)



S(-5,3) → S'(-2,4) → S''(-4,-2)
D(-2,2) → D'(1,3) → D''(-3,1)
X(-5,1) → X'(-2,2) → X''(-2,-2)

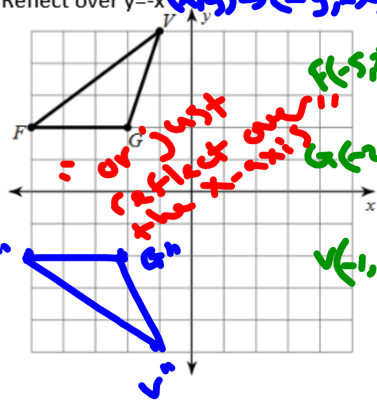
3) Reflect across the x-axis. (x,-y)
Rotate 270° CCW about the origin. (x,y) → (y,x)



E(5,3) E''(-3,-5)
T(4,5) T''(-5,-4)
V(3,5) V''(-5,-3)
Z(4,1) Z''(-1,-4)

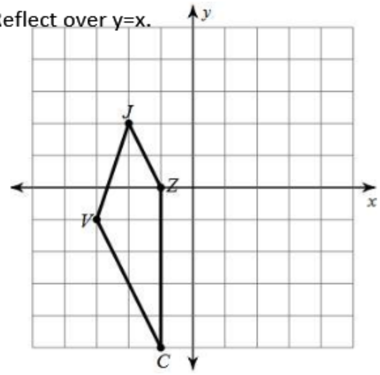
E(5,-3)
T(4,-5)
V(3,-5)
Z(4,-1)

4) Rotate 90° CW about the origin. 270 CCW (x,y) → (y,-x)
Reflect over y=-x (x,y) → (-y,-x)

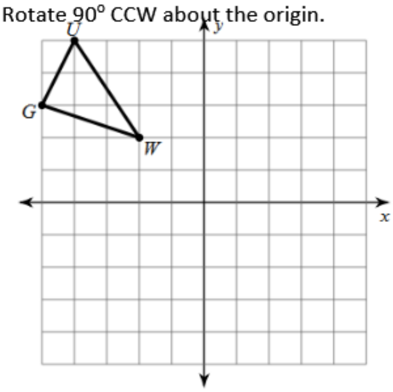


F(-5,2) → F'(2,5)
F''(-5,-2)
G(-2,2) → G'(2,2)
G''(-2,-2)
V(-1,5) → V'(5,1)
V''(-1,-5)

5) Rotate 180° about the origin.
Translate (x,y)->(x-6, y-2).
Reflect over y=x.



6) Reflect across y=x.
Translate left 4 and up 2.
Rotate 90° CCW about the origin.



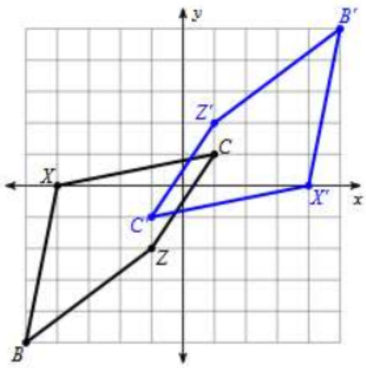
4

$(x, y) \rightarrow (\overset{x}{y}, \overset{y}{-x}) \rightarrow (+x, -y)$

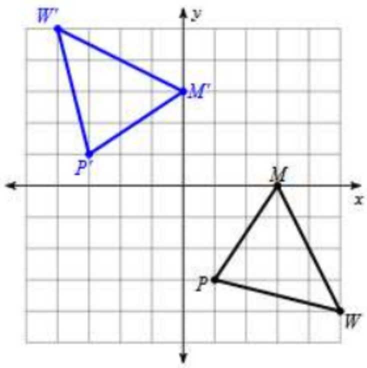
$\underline{(x, y)} \rightarrow \underline{(x, -y)}$

Identify the transformation shown. For a challenge, also find a sequence of transformations for 7, 8, 10, 11.

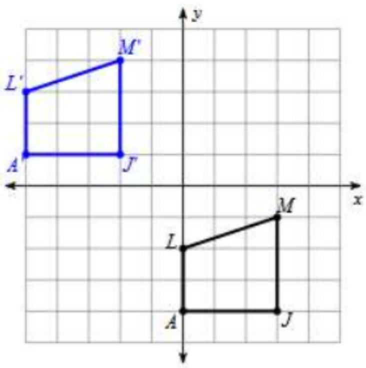
7)



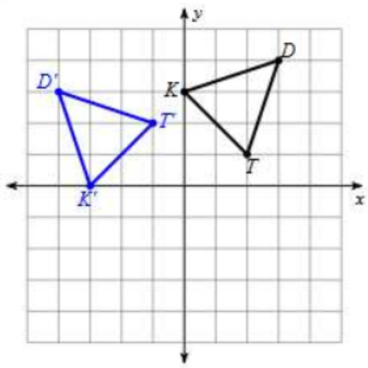
8)



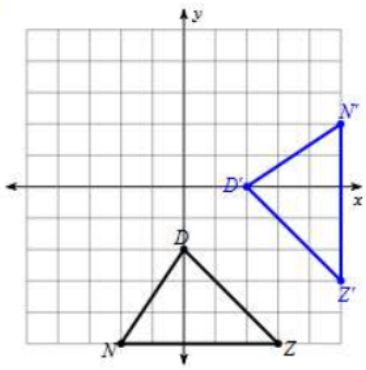
9)



10)



11)



12)