Unit: Transformational Geometry

Assessment Review

Name ______________________________

Period ___________ Date ____________

G.CO.2: *Represent transformations in the plane using, e.g., transparencies and geometry software; describe transformations as functions that take points in the plane as inputs and give other points as outputs. Compare transformations that preserve distance and angle to those that do not.*

1. Translate the quadrilateral $W(-2,2)$, $X(-3,3)$, $Y(-6,5)$, $Z(-6,3)$ using the transformation $(x,y)\to(x-2,y+3)$.

   A. $W'(-4,5)$, $X'(-5,6)$, $Y'(-8,8)$, $Z'(-8,6)$

   B. $W'(0,5)$, $X'(-1,6)$, $Y'(-4,8)$, $Z'(-4,6)$

   C. $W'(0,-1)$, $X'(-1,0)$, $Y'(-4,2)$, $Z'(-4,0)$

   D. $W'(4,6)$, $X'(6,9)$, $Y'(12,15)$, $Z'(12,9)$

2. After a translation, the image $P(-3,5)$ is $P'(-4,3)$. Identify the image of the point Q $(1,-6)$ after this same translation. Then, describe the rule of the rigid transformation in coordinate notation and in words.

   Point Q':___(0,-8)__

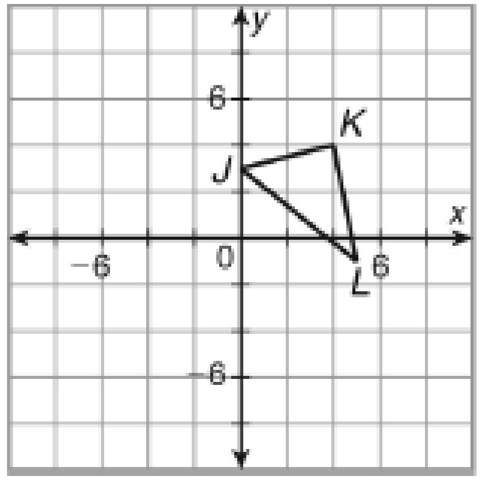
   Coordinate notation:

   $(x,y)\to(x-1,y-2)$

   Words:

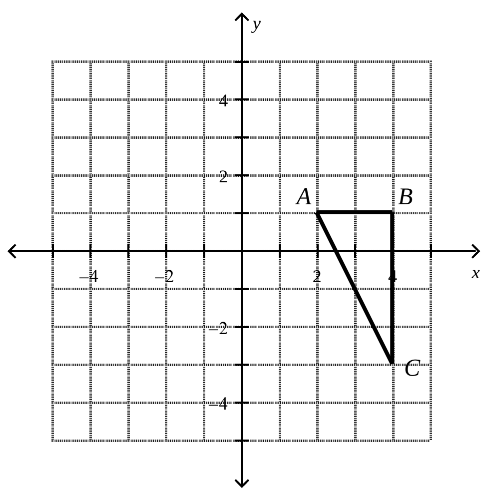
   Left 1 Down 2

3. ΔJKL is rotated 90° **clockwise** about the origin and then translated using $(x,y)\to(x-8,x+5)$. What are the coordinates of the final image of point L under this composition of transformations?



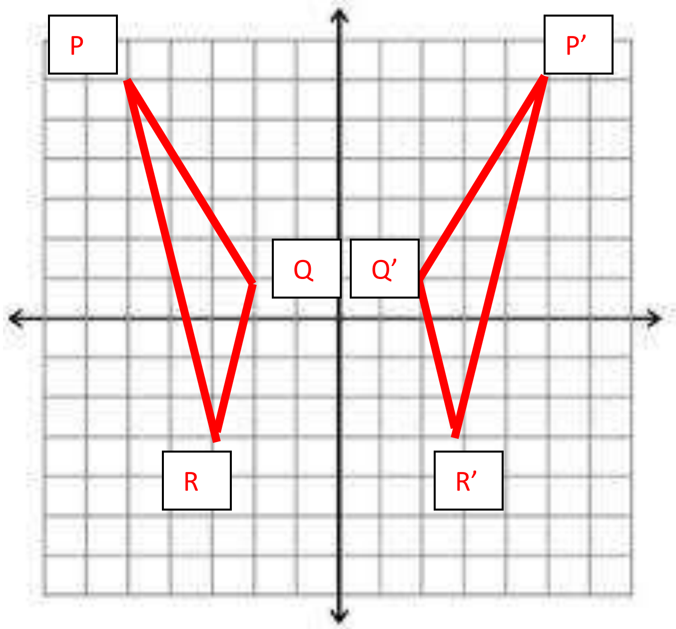
*Answer:*____ $L''(-9,0)$

4. ΔABC is translated using $(x,y)\to(x+1,y-3)$ after it is reflected across the y-axis. What are the coordinates of the final image of point C under this composition of transformations?



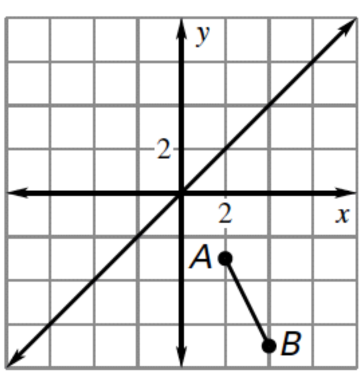
*Answer:*______ $C''(5,6)$ __

5. A triangle with vertices $P(-5,6)$, $Q(-2,1)$, and $R(-3,-3)$ is reflected across the *y*-axis. Graph and label the pre-image and the image. Then write the rule in coordinate notation.



Answer:____ $(x, y) \rightarrow (-x, y)$

6. What are the endpoints of the image $\overline{A'B'}$ if $\overline{AB}$ is reflected about the line $y = x$?



A. $A'(-3, 2)$, $B'(-7, 4)$

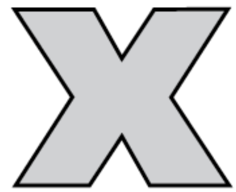
B. $A'(2, 3)$, $B'(4, 7)$

C. $A'(-2,-3)$, $B'(-4,-7)$

D. $A'(3,-2)$, $B'(7,-4)$

G-CO.3: *Given a rectangle, parallelogram, trapezoid, or regular polygon, describe the rotations and reflections that carry it onto itself.*

7. What rotation will map the figure onto itself?



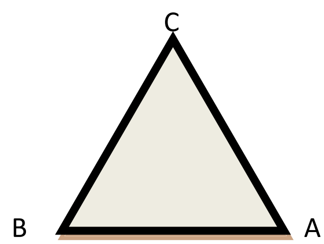
A. $45°$ about the center

B. $90°$ about the center

C. $180°$ about the center

D. $90°$ from the top

8. What is the angle of rotation that maps the equilateral triangle onto itself?

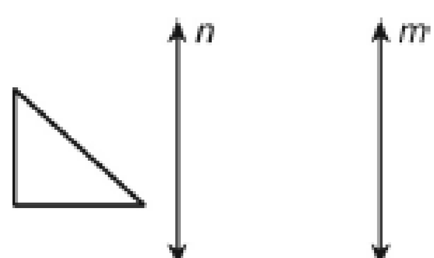


Describe at least 2 ways you can map A onto B?

Rotation 120 degrees clockwise

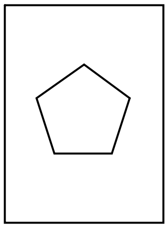
Rotation 240 degrees counterclockwise

9. Identify a **single** transformation that is equivalent to reflecting the figure across line *n* and then reflecting that image across line *m*.

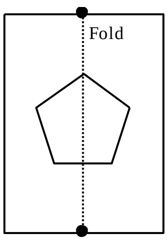


*Answer:*___ translation ___

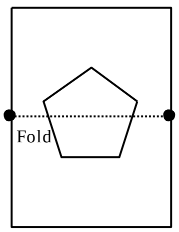
10. Marta is studying the symmetry of a regular pentagon drawn on a piece of paper.



Marta tried folding the paper along a vertical line and horizontal line as shown below and concluded that a regular pentagon has only 1 line of symmetry.



and



She then turned the paper upside down and noted that the figure no longer looks the same. She concluded a regular pentagon has no rotational symmetry.

A. Explain the flaws in Marta's reasoning and describe the true symmetry of the figure.

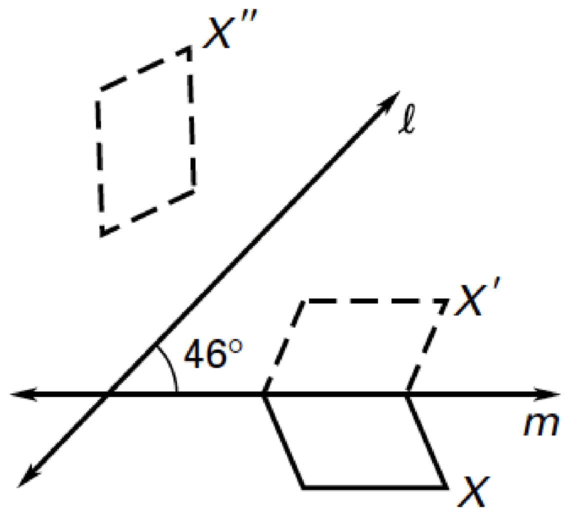
Martha is only looking at vertical and horizontal lines. There are 5 lines of symmetry. The figure has rotational symmetry at 72 degrees.

B. What is the smallest angle of rotation that the figure maps onto itself?

72 degrees

G-CO.4: *Develop definitions of rotations, reflections, and translations in terms of angles, circles, perpendicular lines, parallel lines, and line segments.*

11. What angle of rotation maps X to X''?

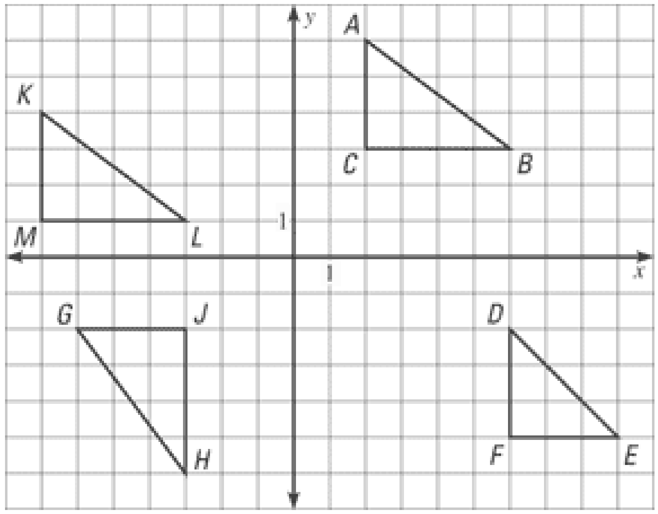


A. 23°
B. 46°
C. 90°
D. 92°

12. Which mapping represents a rotation of 270° *clockwise* about the origin?

A. $(x,y)\to(-x,y)$
B. $(x,y)\to(x,-y)$
C. $(x,y)\to(-y,x)$
D. $(x,y)\to(-y,-x)$

13. Given the figure below.



Part A: Is $\triangle ABC$ to $\triangle DEF$ a congruence transformation? Explain.

No the triangles are different. ABC is right scalene and DEF is a right isosceles.

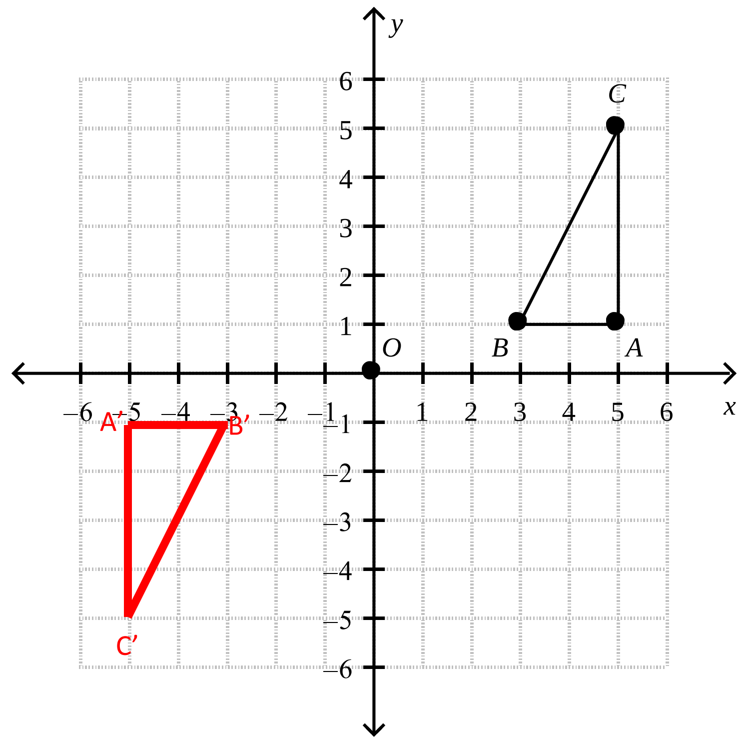
Part B: Is $\triangle ABC$ to $\triangle GHJ$ a rotation? Explain.

Yes, the triangles are same. ABC is right scalene and GHJ is a right scalene. Side lengths are the same, angles are same. It is a ridged transformation. It's a reflection across y=-x

Part C: Use coordinate notation to describe the translation $\triangle ABC$ to $\triangle KLM$.

$$(x, y) \rightarrow (x-9, y-2)$$

14. Cassie claims the transformation rule $(x,y) \rightarrow (-y,-x)$ rotates figures 180 degrees about the origin. Plot $\triangle A'B'C'$, the triangle generated by this rule, and discuss whether Cassie is correct.



Answer:

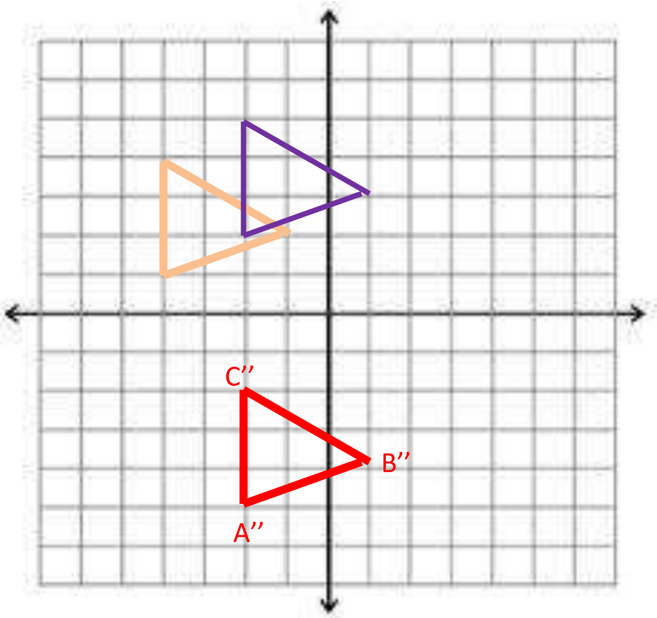
Cassie is wrong. Rotation of 180 degrees rule is

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

15. The vertices of $\triangle ABC$ are $A(-4, 4)$, $B(-1, 2)$, and $C(-4, 1)$. Find the vertices of $\triangle A''B''C''$ after a composition of the transformation in the order they are listed.

Translation: $(x, y) \rightarrow (x+2, y+1)$

Reflection: in the x-axis



*Answer:*____

$A''(-2,-5),\ B''(1,-3), C''(-2,-2)$____

16. When $\triangle FGH$ is reflected over $\overleftrightarrow{PQ}$ to produce $\triangle F'G'H'$, which statement will *not* necessarily be true?

A. $\overline{FF'} \perp \overleftrightarrow{PQ}$

B. $\overline{FP} \cong \overline{GP}$

C. $\overline{FF'} \parallel \overline{GG'}$

D. $\overline{PF'} \cong \overline{PF}$

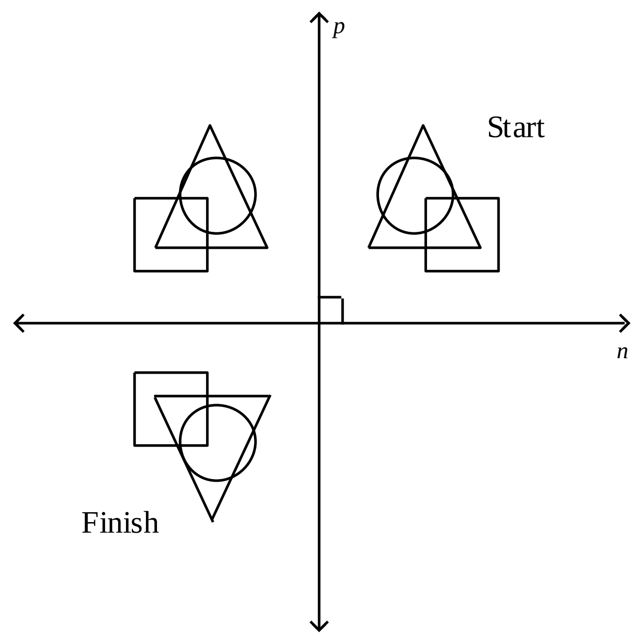
G-CO.5: *Given a geometric figure and a rotation, reflection, or translation, draw the transformed figure using, e.g., graph paper, tracing paper, or geometry software. Specify a sequence of transformations that will carry a given figure onto another.*

17. $\triangle DEF$ with vertices $D(1,2)$, $E(3,4)$, and $F(1,4)$ is reflected across the y-axis, and then its image is reflected across the line $y = x$.

Which single transformation moves the triangle from its starting position to its final position?

A. rotation by $90°$ about the origin
B. rotation by $270°$ about the origin
C. reflection across the x-axis
D. reflection across the y-axis

18. Ann wants to create a design to decorate her Geometry binder. She reflects part of the design across line *p* and then reflects the image across line *n*. Describe a single transformation that moves the part of the design from its starting position to its final position.



A. rotation of 180° about the origin
B. rotation of 90° about the origin
C. translation along the line $p = n$
D. reflection across the line $p = n$

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.*

19. Rhombus *PQRS*, with vertex coordinates

$P(-6, 1)$, $Q(-5, 4)$, $R(-2, 5)$, and $S(-3, 2)$,

was reflected over the line $x = -1$.

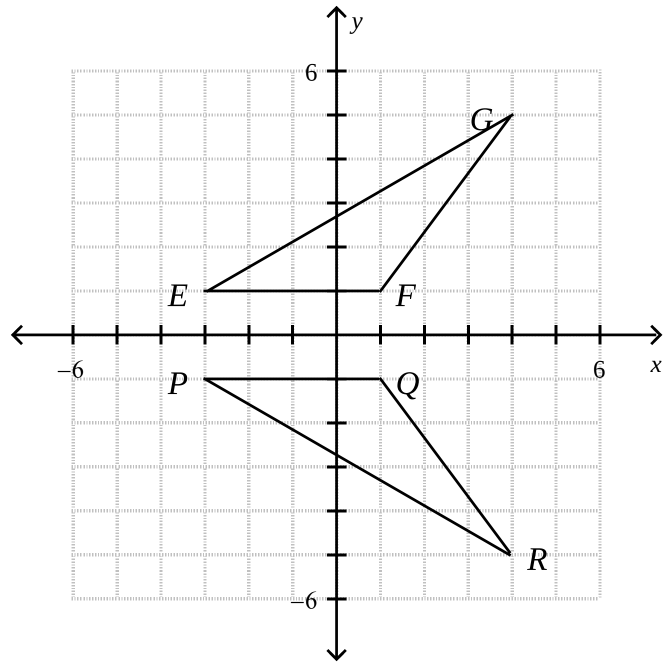
Liam states that the reflection of *PQRS* must also be a rhombus because a reflection is a congruence transformation. Explain what Liam means by this statement.

Answer:

____

Liam means it's a rigid transformation, so it preserves angles and side lengths

20. Determine whether triangles $\triangle EFG$ and $\triangle PQR$ are congruent. Explain.



A. The triangles are congruent because $\triangle EFG$ can be mapped to $\triangle PQR$ by a reflection: $(x,y) \rightarrow (-x,y)$.

B. The triangles are congruent because $\triangle EFG$ can be mapped to $\triangle PQR$ by a rotation: $(x,y) \rightarrow (-y,-x)$.

C. The triangles are congruent because $\triangle EFG$ can be mapped to $\triangle PQR$ by a reflection: $(x,y) \rightarrow (x,-y)$.

D. The triangles are congruent because $\triangle EFG$ can be mapped to $\triangle PQR$ by a rotation: $(x,y) \rightarrow (-y,x)$.