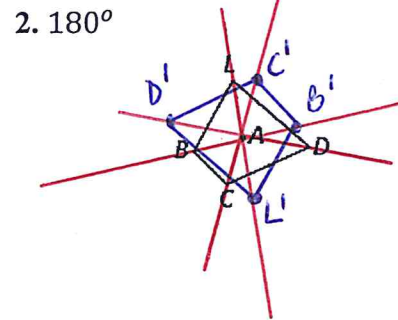
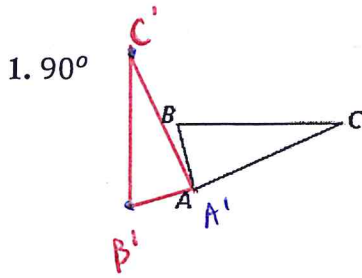
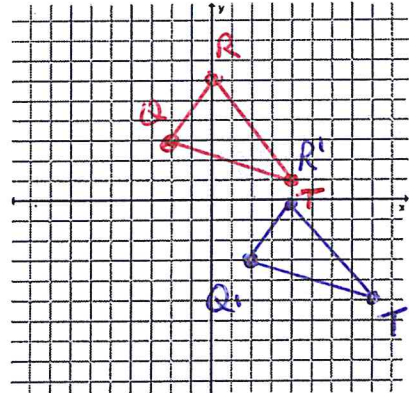


Sketch each figure and point A . Draw the image of each figure for the given rotation about A . Label the vertices of the image.



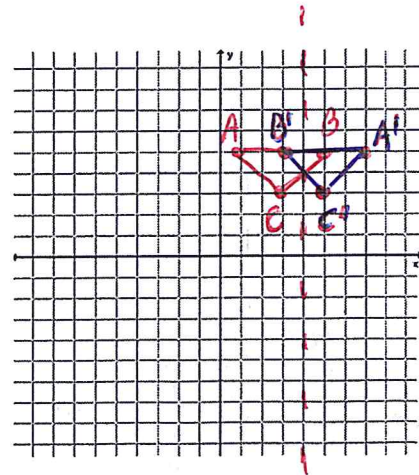
3. Find the image of $\triangle TQR$ with vertices $T(4, 1)$, $Q(-2, 3)$, and $R(0, 6)$ for the translation 4 units right and 6 units down. Write a translation rule.

$$(x, y) \rightarrow (x+4, y-6)$$



Find the image of $\triangle ABC$ with $A(1, 5)$, $B(5, 5)$, $C(3, 3)$ for each transformation

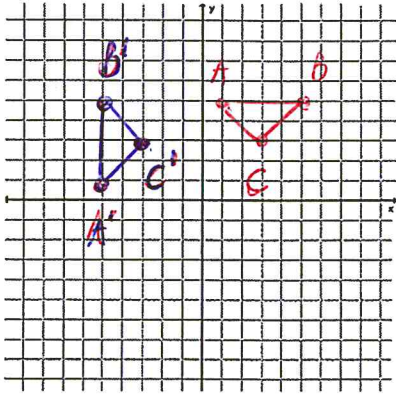
4. reflection across $x = 4$



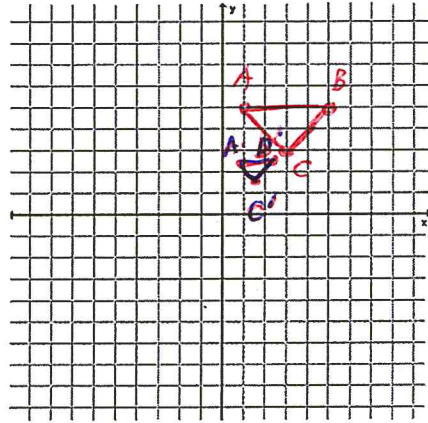
$A(1,5)$ $B(5,5)$ $C(3,3)$

5. rotation of 90° about the point $(0,0)$.

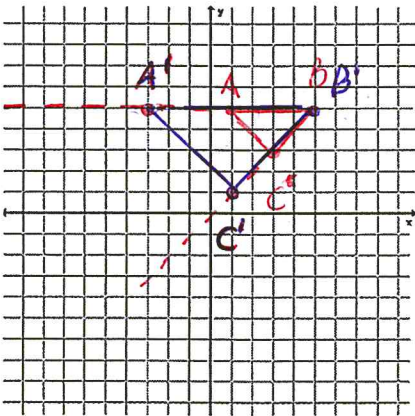
CCW



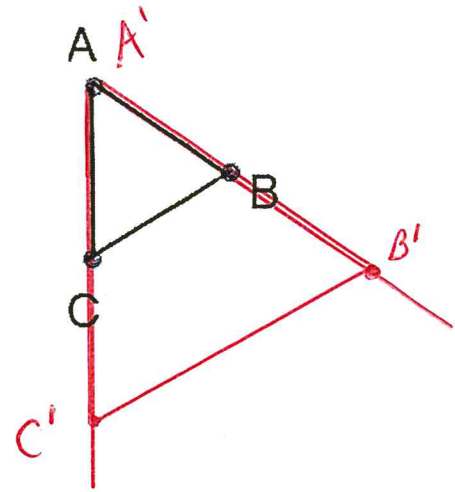
6. dilation with scale factor $\frac{1}{2}$ centered at the origin



7. dilation with scale factor of 2 centered at point B.

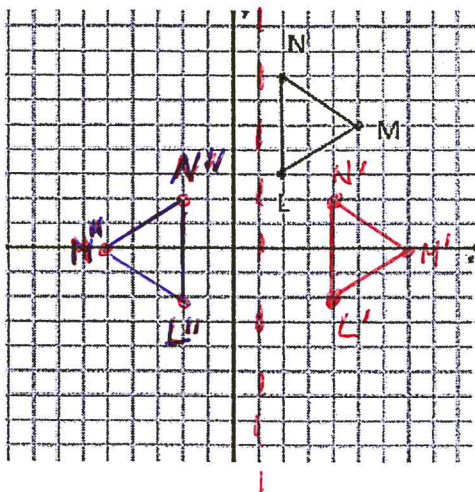


8. Dilate the figure with center A and scale factor 2

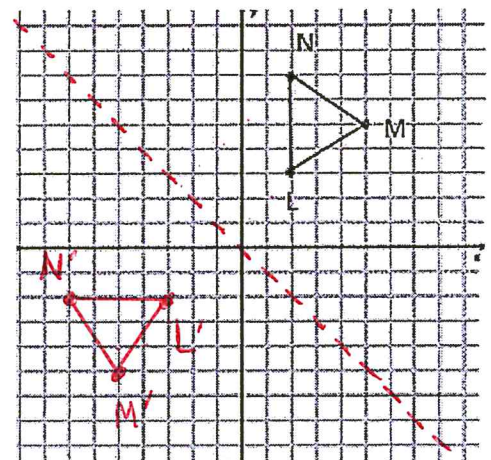


9. translate the given figure $(x,y) \rightarrow (x+2, y-5)$

followed by a **reflection** across $x=1$



10. Reflect across $y=-x$



Geometry Transformations

11. Which of the following is true about circles and rigid transformations?

- (A) Translation does not conserve the length of a circle's radius.
- (B) A circle can be carried onto itself regardless of any rigid transformation performed on it.
- (C) Circles are identical after every 1° of rotation.
- (D) Reflection does not conserve the length of a circle's radius.

13. A triangle has vertices at $A(2, 1)$, $B(4, 4)$, and $C(4, 1)$. Another triangle has coordinates at $D(7, 3)$, $E(9, 6)$, and $F(9, 3)$. How many units must $\triangle ABC$ be translated to carry onto $\triangle DEF$?

- (A) 5 units to the right, 2 units up
- (B) 5 units to the right, 2 units down
- (C) 5 units to the right, 5 units up
- (D) 2 units up

$$\begin{array}{cc} 2 \rightarrow 7 & 1 \rightarrow 3 \\ 4 \rightarrow 9 & 4 \rightarrow 6 \\ 4 \rightarrow 9 & 1 \rightarrow 3 \\ +5 & +2 \end{array}$$

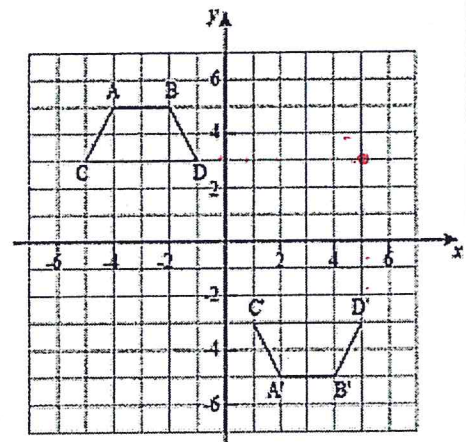
12. Point A has the coordinates $(-4, 4)$. If we want to reflect A across the y -axis to make a new point, B , what will the coordinates of B be?

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

- (A) $(4, -4)$
- (B) $(4, 4)$
- (C) $(-4, -4)$
- (D) $(-8, 8)$

14. Which two transformations or transformation will create trapezoid $A'B'C'D'$ from trapezoid $ABCD$?

- (A) Translation only
- (B) Translation and rotation
- (C) Translation and reflection
- (D) Reflection only



Give the specific rule(s) for your answer.

$$\begin{array}{l} (x, y) \rightarrow (x+2, y) \\ \text{then} \\ (x, y) \rightarrow (x, -y) \end{array}$$

Glide

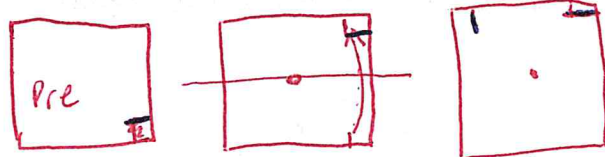
15. The points of rectangle are $L(-4, 6)$, $M(-1, 6)$, $N(-1, 2)$, and $O(-4, 2)$. The rectangle is first reflected across the y -axis and then translated down 4 units and to the left 1 unit. Which of the following are the correct coordinates of rectangle $L'M'N'O'$?

- (A) $L'(3, 2)$, $M'(0, -2)$, $N'(0, 2)$, $O'(3, -2)$
- (B) $L'(3, 2)$, $M'(0, 2)$, $N'(0, -2)$, $O'(3, -2)$
- (C) $L'(-5, -10)$, $M'(-2, -10)$, $N'(-2, -6)$, $O'(-5, -2)$
- (D) $L'(-5, -10)$, $M'(0, -10)$, $N'(-2, -2)$, $O'(-5, -6)$

$$\begin{array}{l} (x, y) \rightarrow (-x, y) \rightarrow (-x-1, y-4) \\ L(-4, 6) \rightarrow (4, 6) \rightarrow (3, 2) \end{array}$$

16. A square mirror has a horizontal scratch in the bottom right corner. If you reflect the mirror across a horizontal axis and then rotate it 90° counterclockwise about origin, where will the scratch be and how will it be oriented?

- (A) Vertically in the bottom right corner
- (B) Horizontally in the top right corner
- (C) Vertically in the top left corner
- (D) Horizontally in the bottom left corner



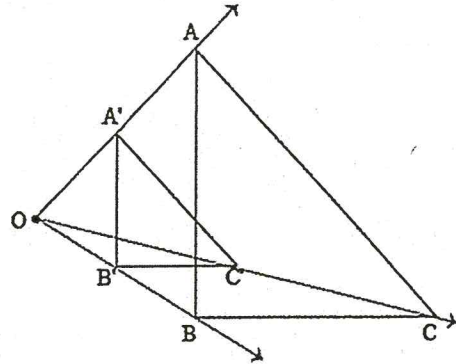
$$(-1, 6) \rightarrow (1, 6) \rightarrow (0, 2)$$

Geometry Transformations

17. What is a scale factor?

- (A) The number by which the distance from the center of dilation to an object is multiplied by to obtain a similar object as measured from the center of dilation to the dilated object
- (B) The number by which the distance from the center of dilation to an object is subtracted by to obtain a similar object as measured from the center of dilation to the dilated object
- (C) The coordinate pair of the center of dilation
- (D) The distance between the two objects or images

18. Which of the following statements is true about the figure?



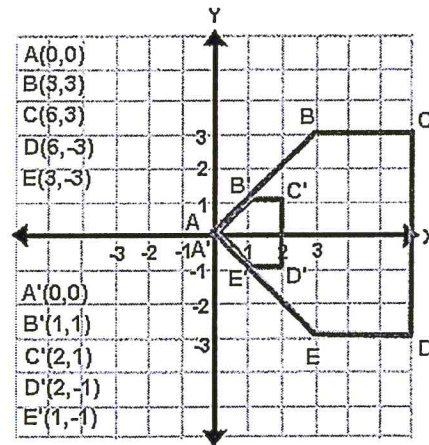
- (A) $\triangle A'B'C'$ is congruent to $\triangle ABC$
- (B) $\triangle ABC$ has been dilated by a factor of 9 to create the image $\triangle A'B'C'$
- (C) $\triangle ABC$ has been dilated using O as the center
- (D) $\triangle ABC$ has been dilated using A' as the center.

19. I can identify the various types of transformations in terms of similar or congruent images.

PROOF OF UNDERSTANDING:

TYPE	PRODUCES?
TRANSLATION	similar or congruent ✓
REFLECTION	similar or congruent ✓
ROTATION	similar or congruent ✓
DILATION	similar or congruent ✓

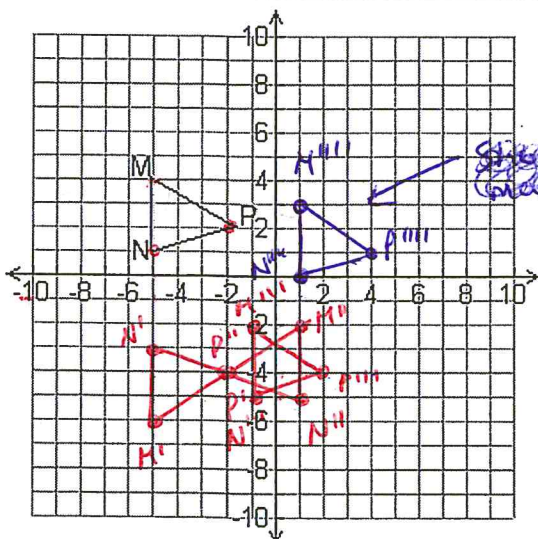
20. I can recognize and explain a dilation in terms of reduction or enlargement.



Explain = Dilation w/ scale factor $\frac{1}{3}$, center (0,0)

Rule $(x, y) \rightarrow (\frac{1}{3}x, \frac{1}{3}y)$

21.



Use the preimage $\triangle MNP$ for the following steps. Every image becomes the pre image of the next step.

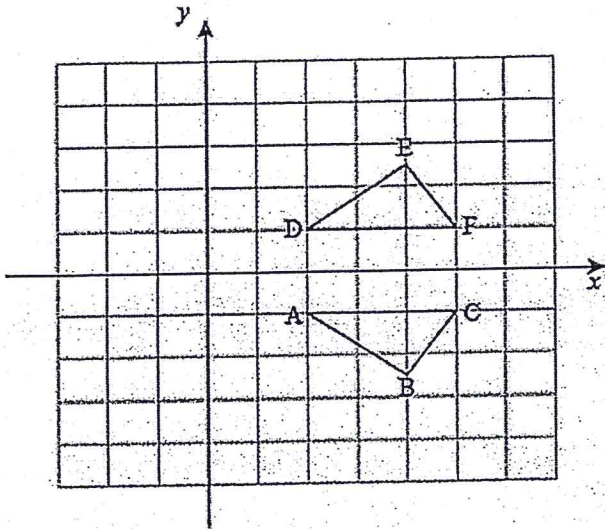
1. Reflect across axis $y = -1$ ✓
2. Rotate -180° about point P' ✓
3. Reflect across y axis ✓
4. $(x, y) \rightarrow (x+2, y+5)$ ✓

What are the coordinates of M''' N''' P'''

$M'''(1, 3)$ $N'''(1, 0)$ $P'''(4, 1)$

22.

What kind of transformation turns $\triangle ABC$ into $\triangle DEF$?



- (A) Translation
- (B) Rotation
- (C) Reflection
- (D) All of the above

Write the rule for this transformation: $(x, y) \rightarrow (x, -y)$

23.

You ride the elevator from the lobby of the Empire State Building to the very top. What transformation is this motion?

- (A) Rotation
- (B) Translation
- (C) Reflection
- (D) Dilation

24.

A community wants to move a skateboard park for safety and noise reasons. The volunteers decide to move the skateboard park 128 feet east and 52 feet south. Assuming the positive y -axis on a coordinate plane as north, which function represents the translation coordinates of the skateboard park?

- (A) $(x, y) \rightarrow (x + 52, y + 128)$
- (B) $(x, y) \rightarrow (x + 128, y - 52)$
- (C) $(x, y) \rightarrow (x - 128, y - 52)$
- (D) $(x, y) \rightarrow (x - 128, y + 52)$

25. How many degrees would a regular octagon (the shape of a stop sign) need to be rotated to carry it onto itself?

- (A) 20
- (B) 30°
- (C) 45°
- (D) 60°

$$\frac{360^\circ}{8} = 45^\circ$$

