

I) Organize the steps for **constructing a 45 degree angle** by writing the number of each step inside each picture (from 1-13).

II) Organize the steps to **constructing a segment perpendicular bisector** by writing the number of the step inside each picture (from 1-10).

III) Organize the steps for **constructing a perpendicular through a point not on the line** by writing the number of the step in order inside the pictures (from 1-10).

IV) Organize the steps for **bisecting an angle** by writing the number of the steps inside the pictures (from 1-12).

V) Identify each shape as translation, rotation, and reflection of the preimage on the left.

A) Refl. Trans. Rot.

B) Rot. Transl. Refl.

VI) Rewrite the following translations into a rule (i.e., translation notation)

- A) 5 units to the right, 3 units down $(x, y) \rightarrow (x+5, y-3)$
 B) 2 units down $(x, y) \rightarrow (x, y-2)$
 C) 9 units to the left, 1 unit up $(x, y) \rightarrow (x-9, y+1)$
 D) 8 units to the right $(x, y) \rightarrow (x+8, y)$

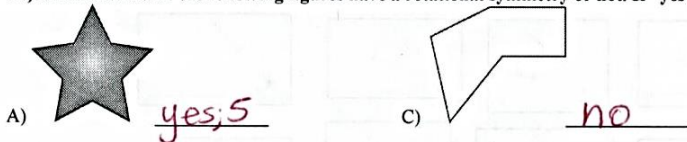
VII) What would the coordinates of the new points be after the translation listed?

- A) $(-3, 5); (x, y) \rightarrow (x+3, y-7)$ $(0, -2)$ C) $(-5, 0); (x, y) \rightarrow (x, y+5)$ $(-5, 5)$
 $(-3+3, 5-7)$ $(-5+0, 0+5)$
 $(0, -2)$ $(-5, 5)$
 B) $(-9, 7); (x, y) \rightarrow (x-8, y)$ $(-17, 7)$ D) $(-2, -3); (x, y) \rightarrow (x, y)$ $(-2, -3)$
 $(-9-8, 7+0)$ $(-2+0, -3+0)$
 $(-17, 7)$ $(-2, -3)$

VIII) Identify the number of lines of symmetry in each figure and draw them to justify your answer.



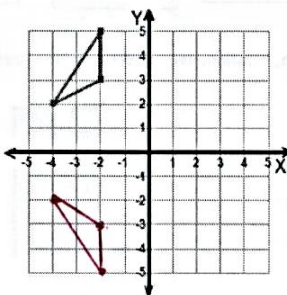
IX) Indicate whether the following figures have a rotational symmetry or not. If "yes", include the order.



of times the shape looks the same when we rotate it before doing a whole 360° turn.

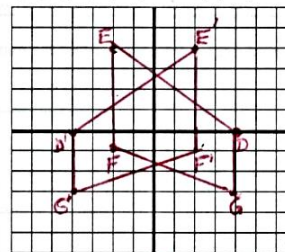
X) Perform the transformations listed. Draw and label both the preimage and the image when applicable.

A) Reflect the preimage across the x-axis.



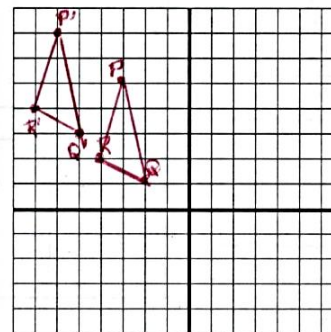
Count the number of spaces it takes for each point in the preimage (the original shape) to get to the x-axis, and then repeat the same number of spaces going straight.

B) Trapezoid with vertices $D(4, 0), E(-2, 4), F(-2, -1)$ and $G(4, -3)$ reflected over the y-axis.



Count the number of spaces it takes to get to the y-axis for each point in the preimage (original shape) + continue straight the same number of spaces. You must label your points for full credit

C) $\triangle PQR$ with vertices $P(-3, 5), Q(-2, 1)$ and $R(-4, 2)$ under the translation $(x, y) \rightarrow (x-3, y+2)$.



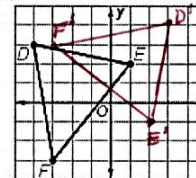
Remember:
 $x+$ → move to the right
 $x-$ → move to the left
 $y+$ → move upwards
 $y-$ → move downwards

Extra credit 1: What would the coordinates in the image of the given points be after the transformation listed?

- A) $(-3, 2); 180^\circ$ rotation about the origin $(2, -3)$
 switch x + y coordinates
 B) $(-12, 15); 90^\circ$ counterclockwise rotation about the origin $(-15, 12)$
 change sign of y -coordinate, then switch x and y .
 C) $(5, 0); 90^\circ$ clockwise rotation about the origin $(0, -5)$
 change sign of x -coordinate, then switch x and y .

Extra credit 2: Rotate $\triangle DEF$ 90° clockwise about the origin. You must label the points in the image for full credit.

- $E(1, 2) \Rightarrow E'(2, -1)$
 $F(-3, -3) \Rightarrow F'(-3, 3)$
 $D(-4, 3) \Rightarrow D'(3, 4)$



- 1) Find the coordinates of each point in the preimage (original shape)
- 2) Since it's 90° cw rotation, change the sign of the x -coordinate, and then switch x and y .
- 3) Plot the new points & label them "prime" (capital letter with an apostrophe).
- 4) connect the points

You must show your work and label your points correctly for full credit.