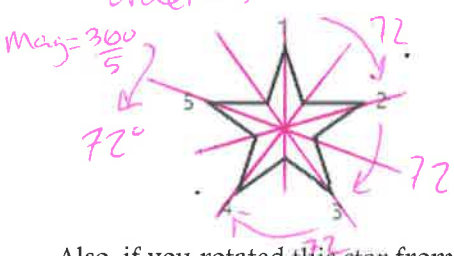
Key

`Unit 2 Study Guide Study Guide - Transformations and Symmetry

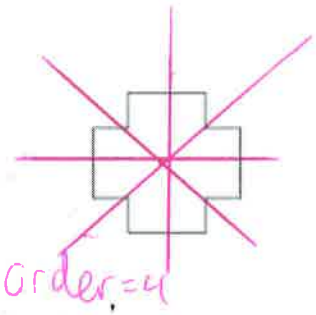
Lines of Symmetry: *Draw the lines of symmetry for each graph and describe the order and magnitude (in degrees) of each that map the object onto itself.*

1. order = 5



Also, if you rotated this star from point 1 to 4, how many degrees would that be for if to map onto itself? 72 · 3 = 216°

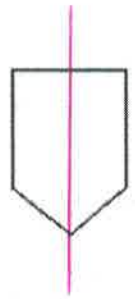
2.



Order = 4

mag = 360/4 = 90°

3.

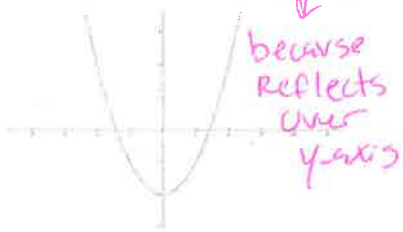


Order = 1

mag = 360

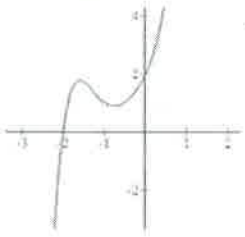
Even/Odd/Neither Symmetry: *Determine if the function is even, odd, or neither.*

4. Even



because reflects over y-axis

5. Neither



6. Draw a graph with odd symmetry

must touch origin & spin 180°

7. If points $(-4,-8)$ ***and*** $(-4,-10)$ are known to be part of a graph that has **even symmetry**, state what additional points must also be part of the graph.

(4, -8) (4, -10)

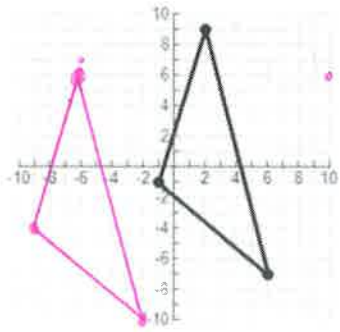
8. If points $(3,-6)$ ***and*** $(-2,7)$ are known to be part of a graph that has **odd symmetry**, state what additional points must also be part of the graph.

(-3, 6) (2, -7) (0, 0)

Translations

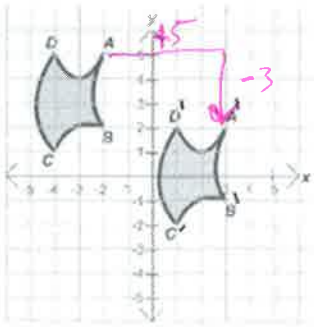
9. Complete the following translation

$T(x, y) \rightarrow (x-8, y-3)$



10. Write a function for the translation

$T(x, y) =$ (x+5, y-3)



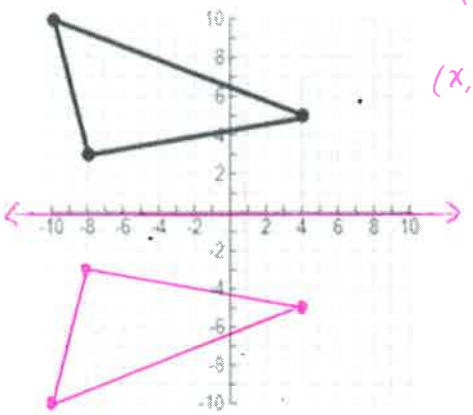
11. Given the new image $P'(-2, 1)$ and the translation $T(x, y) = (x - 4, y - 3)$, determine the coordinates of the original point P ?

find pre image → do T(x, y) backwards!

(-2 + 4, 1 + 3) → P = (2, 4)

Reflections

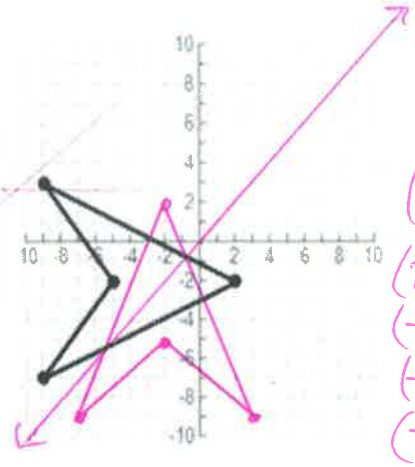
12. Reflect the object across the x-axis



$R_{x\text{-axis}}$

$(x,y) = (x,-y)$

13. Complete the reflection: $R_{y=x}$



$R_{y=x}$

$(x,y) = (y,x)$

$(2,2) \rightarrow (-2,2)$

$(-9,3) \rightarrow (3,-9)$

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

$(-9,-7) \rightarrow (-7,-9)$

Using points $(-10,7)$, $(8,-4)$, $(9,6)$, perform the following transformations

14. Reflect all points about the x-axis

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

$(-10,-7)(8,4)(9,-6)$

15. Reflect all points about the y-axis

$(x,y) = (-x,y)$

$(10,7)(-8,-4)(-9,6)$

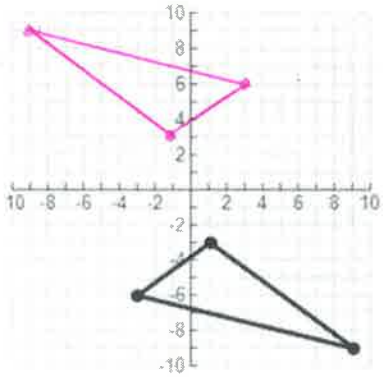
16. Reflect about the line $x = -2$.

find distance from -2 in x direction

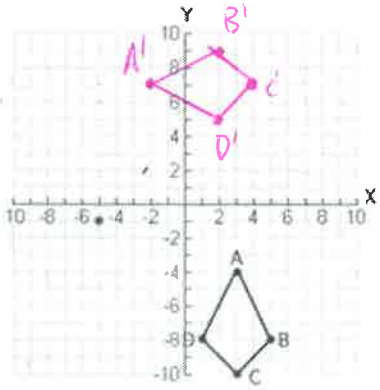
$(6,7)(-12,-4)(-13,6)$

Rotations

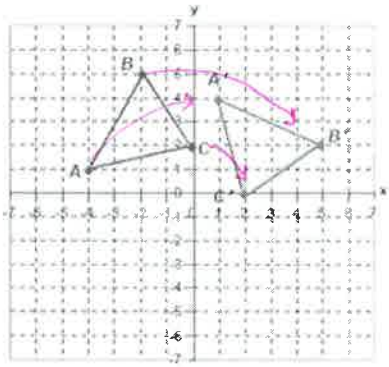
17. Rotate the object 180° about the origin.



18. Rotate the figure **90°** about the point: $R_{90°}, (-5,-1)$.)



19. Determine the rule that performs the rotation.



Rotation of 90° cw or 270° ccw

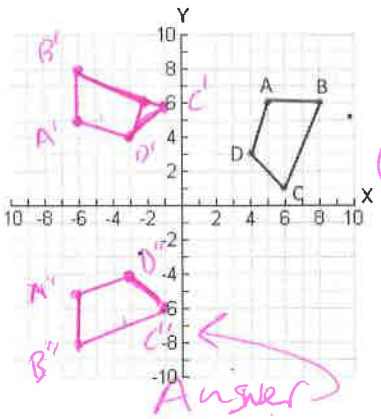
$R_{90° \text{ cw}}$

or

$R_{270°}$

Combining Transformations – Make sure you label the post-image.

20. R_{90} *and* R_{x-axis} $\rightarrow (x,y) \rightarrow (-y,x)$

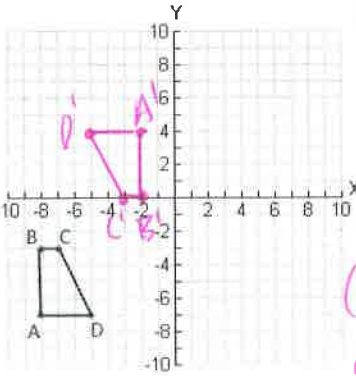


$(x,y) \rightarrow (x,-y)$

$(4,3) \rightarrow (-3,4) \rightarrow (-3,-4)$

Answer

21. $T(x+10, y+3)$ *and* R_{180}



$(x,y) \rightarrow (x+10, y+3)$

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

$(-5,-7) \rightarrow (5,-4) \rightarrow (-5,4)$

$(-8,-7)\ (2,-4) \rightarrow (-2,4)$

$(-8,3)\ (2,0) \rightarrow (-2,0)$

Write the location of the point once the requested transformation has been completed.

22. Reflect M (3, 4) across the y-axis. $M' = (-3,4)$
23. Rotate P (2, −4) 90° around the origin. $P' = (4,2)$
24. Given B (6,3) transform by $R_{270}(x, y)$. $B' = 3,-6$
25. Given D (2, 7) transform by R(x, y) = (y, x). $D = (7,2)$
26. For #25, what is the line of reflection? $y = x$