**Unit 1 Test Review**

Name _____

Using the function $f(x) = 3x$ write a function that has the given transformations.

1. A vertical shift up 5 units

$\underline{f(x) + 5}$

2. A steeper slope by a factor of 4

$\underline{4f(x)}$

3. A vertical shift down 3 units and a reflection across the x-axis

$\underline{-f(x) - 3}$

4. Write all the transformations that occur to the parent graph for the function $g(x) = -\frac{1}{2}f(x) - 4$.

- flip
- shrink by $\frac{1}{2}$
- down 3

5. The function $f(x)$ has been graphed on the coordinate grid. Sketch the following functions given the transformations. **Make sure to label each line on the graph.**

a. $g(x) = f(x) + 6$

b. $h(x) = f(x) - 4$

c. $j(x) = 3f(x)$

d. $k(x) = -f(x) + 3$

e. $n(x) = -f(x) - 2$
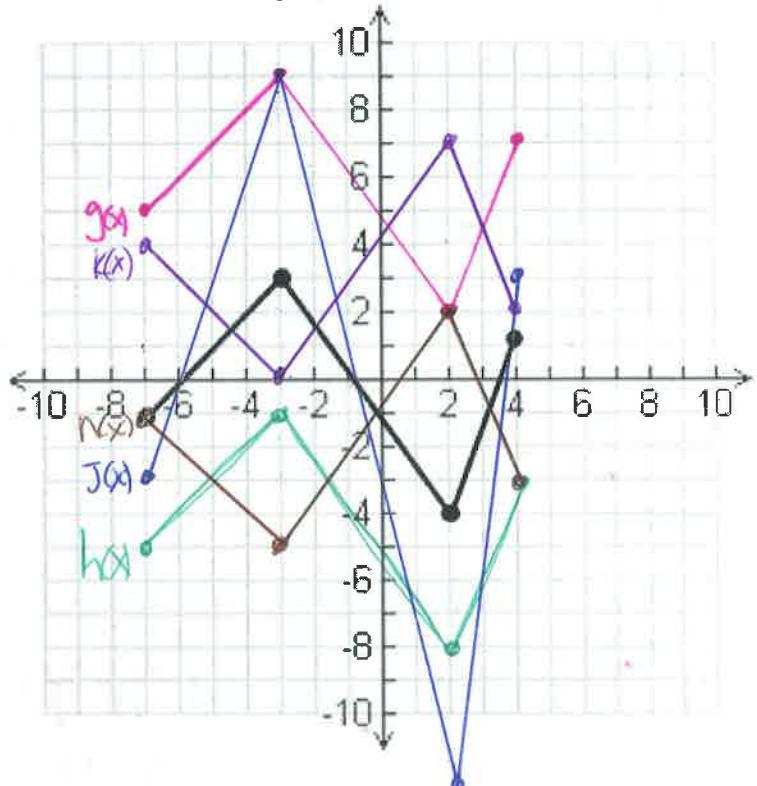


**Symmetry**

Describe the lines of reflections and rotations (in degrees) that will map the object onto itself.

6.
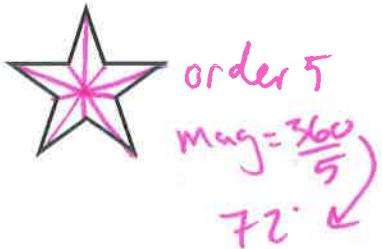


order 5
mag = $\frac{360}{5}$
72°

7.



order = 4
mag = $\frac{360}{4}$
90°

8.
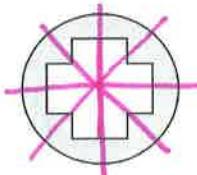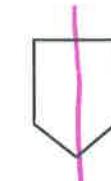


order = 1
mag = $\frac{360}{1}$
360°

## Combining Transformations

Name the transformation that maps:

17. ΔABC→ΔCDE
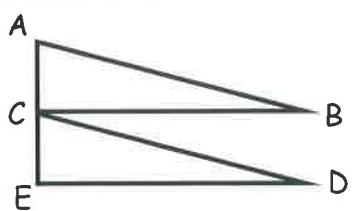


*translation*

18. ΔABC→ΔDEF
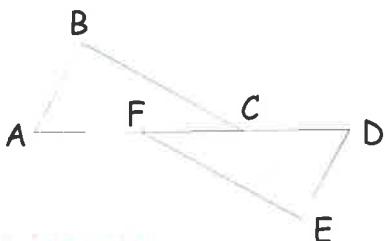


*Rotation or double reflection*

19. ΔPMR→ΔPMQ
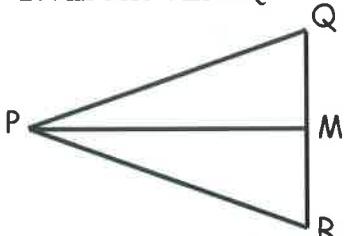


*Reflection*

20.



*translation*

21.



*Rotation or Reflection*

22.
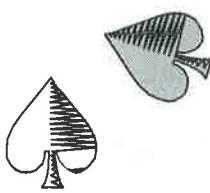


*Rotation only*

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

23. Reflect M (3, 4) across the y-axis. $\to (-x, y)$   $M' = (3, -4)$

24. Rotate P (2, -4) 90° around the origin.
$\to (-y, x)$   $P' = (4, 2)$

25. Translate N (0, 8) up four units and left 5.
$(x-5, y+4)$   $N' = (-5, 12)$

26. Given B (6,3) transform by $R_{270}(x,y)$.
$\to (y, -x)$   $B' = (3, -6)$

27. Given D (2, 7) transform by R(x,y) = (y,x).
What is the line of reflection?   $y = x$
$D' = (7, 2)$

28. 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 ?

$(x+4, y+3)$

$(-2+4, 1+3)$
$P = (2, 4)$