

Honors Math 2 - Fall 2017

Unit 3 Review - Transformations

Name: _____

Date: _____

KEY

1. The vertices of triangle PQR are located at P(2, 5), Q(12, 20), and R(12, 5). The vertices of the triangle will undergo the transformation described by the rule $(x, y) \rightarrow (\frac{1}{2}x, \frac{1}{2}y)$.

a) How does the perimeter of the shape change?

$$\frac{1}{2}$$

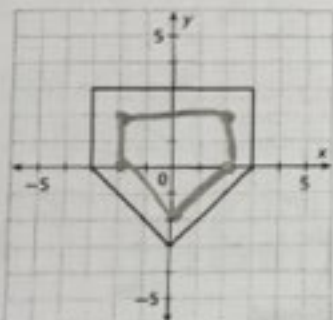
b) How does the area of the shape change?

$$\frac{1}{4}$$

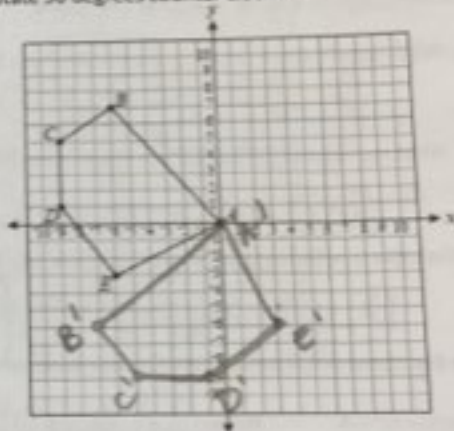
Draw the image of the figure after the transformation and list the coordinates.

2. Dilate

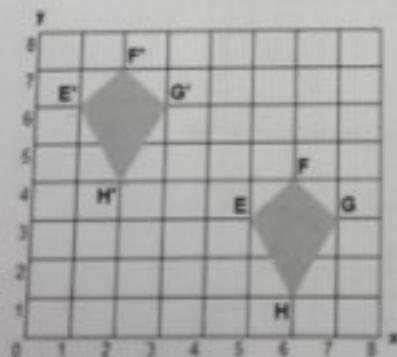
scale factor: $\frac{2}{3}$



3. Rotate 90 degrees counter clockwise



4. Given the graph below, write a rule that would take EFGH to E'F'G'H'



$$(x, y) \rightarrow (x-4, y+3)$$

Write a rule using arrow notation.

5. A translation 3 units right and 5 units down followed by a reflection across the line $y = x$.

$$(x, y) \rightarrow (x+3, y-5) \rightarrow (y-5, x+3)$$

6. A rotation of 90 degrees followed by a translation 4 units left and 2 units up.

$$(x, y) \rightarrow (-y, x) \rightarrow (-y-4, x+2)$$

7. A reflection across the x-axis following a 270 degree rotation clockwise.

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

8. A translation 10 units left and 7 units down, followed by 180 degree rotation.

$$(x, y) \rightarrow (x-10, y-7) \rightarrow (-x+10, -y+7)$$

9. A translation 2 units to the left following a dilation of by a scale factor of 7.

$$(x, y) \rightarrow (7x-2, 7y)$$

Use the graph to answer the questions below.

10. What rule (in arrow notation) would take Point B to Point E?

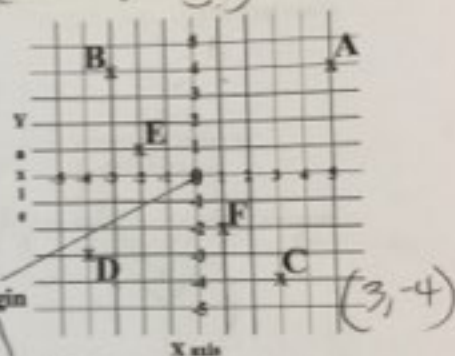
$$(x, y) \rightarrow (x+1, y-3)$$

11. What transformation would take Point C to Point B?

$$(x, y) \rightarrow (x-6, y+8) \quad \text{Rotate } 180^\circ$$

12. Describe a reflection that would take Point B to Point A.

$$(x, y) \rightarrow (x+8, y) \quad \text{Reflect over } x=1$$



Give the name of the parent function and describe the transformation represented.

13. $g(x) = x^2 + 4$

Name: Quadratic

Transformation: up 4

14. $f(x) = 2|x-1|$

Name: Absolute Value

Transformation: V.S by 2, right 1

15. $h(x) = \sqrt{x-2}$

Name: Radical

Transformation: right 2

16. $g(x) = x^3 + 7$

Name: Cubic

Transformation: up 7

17. $f(x) = |x+5| - 2$

Name: Absolute Value

Transformation: down 2, left 5

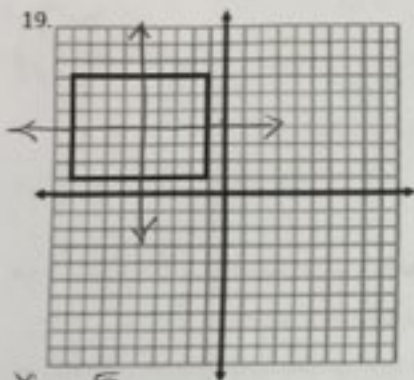
18. Understanding isometry, congruence, and similarity

- a) What type(s) of transformations preserve angle measure? *translations, rotations, reflections*
- b) What type(s) of transformation preserve congruent figures? *translations, rotations, reflections*
- c) What type(s) of transformations preserve similarity but not congruence?

dilation

Write the equations of the line(s) of symmetry that will reflect the figure onto itself. (Draw them in, too)

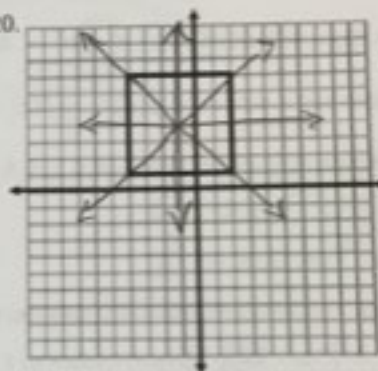
19.



$$x = -5$$

$$y = 4$$

20.



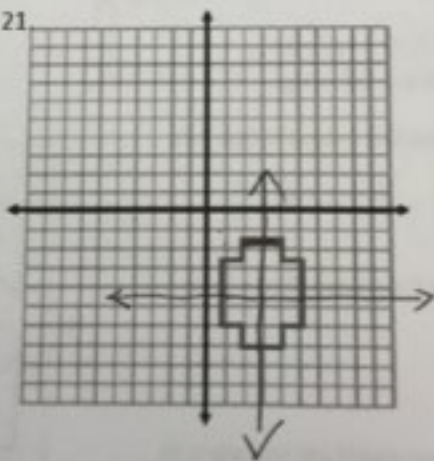
$$x = -1$$

$$y = 4$$

$$y = x + 5$$

$$y = -x + 3$$

21.



$$x = 3$$

$$y = -4.5$$

22. Given the function $y = 3x - 2$, give the equation of a function that's been flipped over the x-axis, dilated by 3 and shifted up 2.

$$-3(3x - 2) + 2$$

$$-9x + 6 + 2$$

$$-9x + 8$$

23. Given $f(x) = x^2$ and $g(x) = (x + 3)^2 - 2$

- a) Describe in words the translation from $f(x)$ to $g(x)$. *left 3, down 2*
- b) State the domain of $g(x)$ \mathbb{R}
- c) State the range of $g(x)$ $[-2, \infty)$

24. The function $f(x)$ is defined as $f(x) = 2x^2 - 4x + 1$

The function $g(x)$ is defined as $g(x) = -\frac{1}{2}f(x) + 1$

- a. Graph both $f(x)$ and $g(x)$ for $-4 \leq x \leq 4$.

$$g(x) = -\frac{1}{2}(2x^2 - 4x + 1)$$

$$g(x) = -x^2 + 2x - \frac{1}{2}$$

- b. Describe the transformations that take $f(x)$ onto $g(x)$.

*VC by 1/2
Reflect x-axis
up 1*

- c. Write a new function, $h(x)$, that transforms $g(x)$ back onto $f(x)$.

$$h(x) = 2g(x) + 1$$

25. Given the figure below, complete the following:

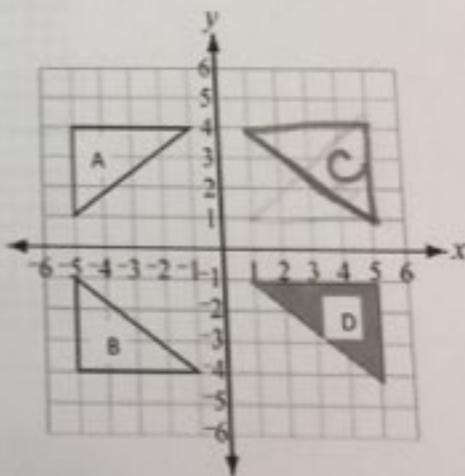
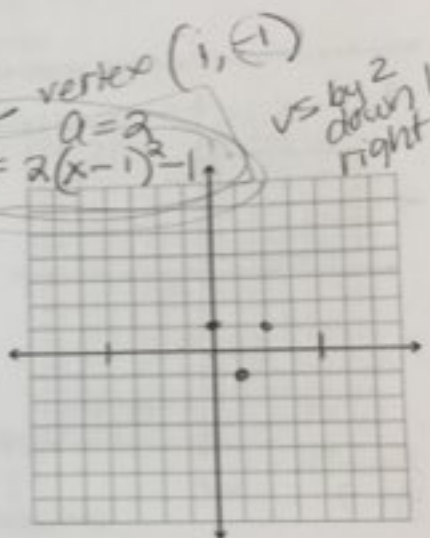
- a) Describe the transformation that maps triangle A to triangle B:

Reflect x-axis

- b) Draw the image of triangle C if triangle B has been rotated 180°

- c) What type of transformation would get triangle C to map to triangle D?

down 5



26. The graph of $f(x) = x^2$ will be translated 3 units down and 4 units to the right.

a) Create a function, in standard (polynomial) form.

$$f(x) = (x-4)^2 - 3$$

$$f(x) = x^2 - 8x + 13$$

b) State the domain and range of the function.

$$D: \mathbb{R}$$

$$R: [-3, \infty)$$

27. The graph of $f(x) = x^2$ will be translated 2 units up and 5 units to the left. $f(x) = (x+5)^2 + 2$

a) Create a function, in standard (polynomial) form.

$$f(x) = x^2 + 10x + 27$$

b) State the domain and range of the function.

$$D: \mathbb{R}$$

$$R: [2, \infty)$$

28. What translation happened to $f(x) = (x-3)^2 + 7$ to make it map on $g(x) = (x+2)^2 - 4$?

$$(3, 7)$$

$$(-2, -4)$$

Left 5

Down 11

29. What translation happened to $f(x) = (x+1)^2 + 5$ to make it map on $g(x) = x^2 - 9$?

$$(-1, 5)$$

$$(0, -9)$$

Right 1

down 14