Math 2 - Honors
Name $\qquad$
Unit 1-Geometric Transformations

## Unit Review

- For each transformation, state the coordinates for each:

|  | Image of $(x, y)$ | Image of (1,4) | Image of $(-2,7)$ |
| :--- | :--- | :--- | :--- |
| 1. Reflect over $y$ - axis |  |  |  |
| 2. Reflect over $x$ - axis |  |  |  |
| 3. Reflect over $y=x$ |  |  |  |
| 4. Reflect over $y=-x$ |  |  |  |
| 5. Rotate $90^{\circ}$ clockwise about the origin |  |  |  |
| 6. Rotate $90^{\circ}$ counterclockwise about <br> the origin |  |  |  |
| 7. Rotate $180^{\circ}$ about the origin |  |  |  |
| 8. Rotate $270^{\circ}$ about the origin |  |  |  |

- For each of the following, graph and label the image for each transformation described.
- Then write using the correct notation.

8. Reflect over the line $y=-1$
9. Rotate $180^{\circ}$ about the origin
10. Translate right 4 units \& down 3 units




- State whether the specified pentagon is mapped to the other pentagon by a reflection, translation, or rotation

11. Pentagon 1 to Pentagon 3
$\qquad$
12. Pentagon 5 to Pentagon 6
13. Pentagon 2 to Pentagon 5
14. Pentagon 1 to Pentagon 2
15. Pentagon 4 to Pentagon 6
$\qquad$
$\qquad$


- Perform each of the transformations using the set of points below for \#16-19.

$$
\{(7,-4) \quad(0,6)(-2,3)\}
$$

| 16. Reflect over the $y$-axis | 18. Rotate $90^{\circ}$ counter - clockwise |
| :--- | :--- |
| 17. Reflect over the line $y=-x$ | 19. Dilate by a scale factor $\mathrm{r}=1 / 2$ |

- Answer each of the following.

20. If translation $(5,-3) \rightarrow(-4,0)$, then $(8,2) \rightarrow($ $\qquad$ , $\qquad$
21. If $T:(x, y) \rightarrow(x-5, y+2)$ and the point $\mathrm{F}^{\prime}(7,-6)$, then find the point F . $\qquad$
22. $M$ is reflected over the $y$-axis. If $M$ is $(6,-1)$, find $M^{\prime}$. $\qquad$
23. $C$ is rotated about the origin $90^{\circ}$. If $C^{\prime}$ is $(-9,5)$, find $C$. $\qquad$
24. $Y$ is rotated counterclockwise $180^{\circ}$. If the image of $Y^{\prime}$ is $(0,-3)$ find $Y$. $\qquad$
25. A figure is reflected over the line $y=x$. If the preimage is $(2,7)$, find the image. $\qquad$
26. $\triangle A B C$ has vertices $A(5,-2), B(-4,0), C(7,1)$.

Find the coordinates of the image of the triangle if it is dilated by a scale factor $r=3$.
$A^{\prime}($ $\qquad$ , $\qquad$ )
$B^{\prime}($ $\qquad$
$\qquad$ )
$C^{\prime}($ $\qquad$ )
27. Dilate $\triangle A B C$ using a scale factor $r=\frac{1}{4}$.


Explain why the two triangles are similar.
28. $A B C D$ is dilated by a scale factor of $r=2$ to produce $A^{\prime} B^{\prime} C^{\prime} D^{\prime}$. The lengths of the segments of the preimage are as follows:

$$
A B=6 \quad B C=5 \quad C D=3 \quad A D=4
$$

a. What is the length of $\overline{B^{\prime} C^{\prime}}$ ?
b. What is the length of $\overline{A^{\prime} B^{\prime}}$ ?

c. If the slope of $\overline{C D}$ is $\frac{1}{3^{\prime}}$, what is the slope of $\overline{C^{\prime} D^{\prime}}$ ? What allows you to make this conclusion?
29. $P Q R S T \sim U W X Y Z$ with a scale factor of 2:5. If the perimeter of $U W X Y Z$ is 40 inches, what is the perimeter of $P Q R S T$ ?
30. For each problem, there is a composition of motions. Using your algebraic rules, come up with a new rule after both transformations have taken place.
a. Translate a triangle 5 units left and 3 units $u p$, and then reflect the triangle over the $x$-axis.
b. Translate a triangle 2 units right and 7 units down, and then rotate $90^{\circ}$ clockwise.
c. Rotate a triangle 90 degrees counterclockwise, and then reflect in the line $y=x$.
d. Reflect in the line $y=-x$, and then translate right 4 units and down 2 units.
31. An equilateral triangle with sides of length 12 cm is reflected consecutively across two lines that are parallel and 12 cm apart. Describe the result using another type of transformation.
32. The diagonals of Regular Hexagon $A B C D E F$ form six equilateral triangles as shown.

Fill in the correct letter after the given transformation:
a. Rotate $60^{\circ}$ clockwise: $E \rightarrow$ $\qquad$
b. Rotate $60^{\circ}$ counter - clockwise: $D \rightarrow$ $\qquad$

c. Rotate $120^{\circ}$ clockwise: $F \rightarrow$ $\qquad$
d. Rotate $60^{\circ}$ clockwise: $\qquad$ $\rightarrow B$
e. If a translation maps $A$ to $B$, then it also maps $O$ to $\qquad$ and $E$ to $\qquad$ .
f. A reflection occurs over $\overleftrightarrow{F C}, B$ maps to $\qquad$ and $F$ maps to $\qquad$ .

Solve:

| 33. $\frac{2}{x}=\frac{4}{x+3}$ | 34. $2 x+6=4(x+8)$ | $\text { 35. } \begin{array}{r} 2 x+3 y=6 \\ y=\frac{-1}{3} x+3 \end{array}$ |
| :---: | :---: | :---: |
| $\text { 36. } \quad \begin{aligned} & 2 x+3 y=7 \\ & 3 x-3 y=-12 \end{aligned}$ | $\text { 37. } \begin{array}{ll} 3 x+5 y=6 \\ & 2 x-4 y=-7 \end{array}$ | $\text { 38. } \begin{aligned} & 6 x-8 y=50 \\ & \\ & 4 x+6 y=22 \end{aligned}$ |

39. Given a line segment with endpoints (1, -2) and (4,5)
A) State the domain and range of the pre - image segment.
D: $\qquad$
$\qquad$ ]_ R: _[___]_
B) State the domain and range of the image interval notation when the relation is:
a) Translated right 1 and up 4:
D: $\qquad$
R: $\qquad$
d) Reflected in the line $y=x$ :
D: $\qquad$
R: $\qquad$
b) Reflected in the $\boldsymbol{x}$-axis:
e) Rotated $90^{\circ}$ :
D: $\qquad$
D: $\qquad$
R: $\qquad$
c) Reflected in the $\boldsymbol{y}$-axis:
D: $\qquad$
f) Dilated by a factor of 5 with a center of $(\mathbf{0}, \mathbf{0})$ :
D: $\qquad$
R: $\qquad$
R: $\qquad$
