**Geometry HW: Transformations - Review**

1. What is the image of (1, –4) after a reflection in the origin?

2. The point $R(2, -5)$ is reflected in the $y$-axis. What are the coordinates of the image of $R$?

3. If a point in Quadrant II is reflected in the $x$-axis, its image will lie in what quadrant?

4. The image of point $A(-4, 7)$ after a reflection in point $P$ is $A'(8, 1)$. What are the coordinates of point $P$?

5. What is the image of $A(6, -3)$ after a reflection in the line $y = x$?

6. A translation moves $P(5, -2)$ to $P'(1, 3)$. What is the image of (–2, 3) under the same translation?

7. If the image of point $A(-2, 5)$ after a reflection in line $k$ is $A'(8, 5)$, find the equation of line $k$.

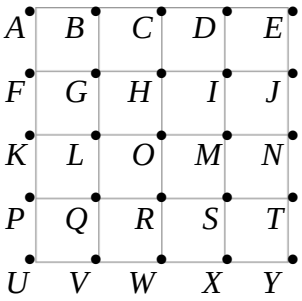
8. Which transformation does not preserve distance?
   (1) Dilation (2) Line reflection (3) Rotation (4) Translation

9. What is the constant of dilation $k$ if $D_k(-6, 18) = (-4, 12)$?

10. What is the image of $S(3, -5)$ after a 90° rotation about the origin?

11. Under the translation $(x, y) \rightarrow (x + 3, y - 5)$, what is the ***pre-image*** of the point (1, –1)?

12. Which of the following is *not* the same as the other three?
(1) $R_{90°}(3, 3)$ (2) $T_{0,-6}(3, 3)$ (3) $r_{x\text{-axis}}(3, 3)$ (4) $R_{(3, 0)}(3, 3)$




13. Which is the image of **A** under the transformation $r_{x\text{-axis}} \circ R_{90°}$ ?
(1) **A** (2) **>** (3) **∀** (4) **<**

**For questions 14 – 16, refer to the figure at right.**

14. Under a certain translation, the image of $Q$ is $H$. Under the same translation,
a. what is the image of $X$? b. what is the image of $\angle ORS$?

15. What is the image of $B$ after a 180° rotation around point $H$?

16. What is the image of $F$ after a 270° rotation around point $O$?

17. Find the image of the point $P(4, 3)$ after each of the following.
a. $r_{y\text{-axis}} \circ D_2(P)$ b. $r_{y=x} \circ T_{2,-4}(P)$ c. $D_4 \circ R_{90°}(P)$
d. $r_{x\text{-axis}} \circ r_{y=x}(P)$ e. $r_{y=3} \circ R_O(P)$ f. $T_{-4,2} \circ D_2(P)$

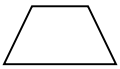
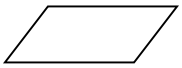
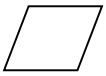
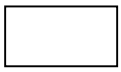
18. In an isometry, which of the following might *not* be preserved?
(1) Angle measure (2) Parallelism (3) Orientation (4) Area

19. Find the value of $y$ if $D_k(8, y) = (12, 9)$.

20. Which of the following is *not* an example of a glide reflection?
(1) $T_{4,4} \circ r_{y=x}$ (2) $r_{x=2} \circ T_{2,0}$ (3) $T_{0,3} \circ r_{x-axis}$ (4) $r_{y-axis} \circ T_{0,3}$

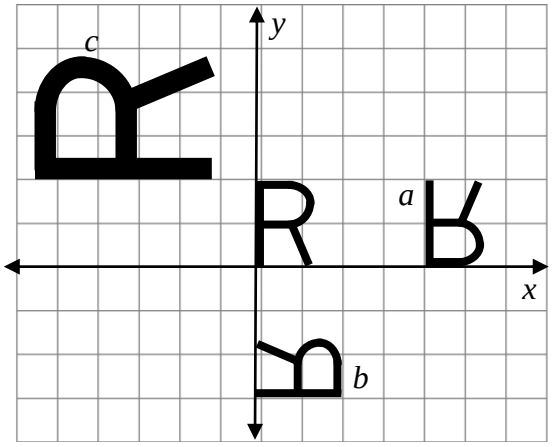
21. Triangle $ABC$ has perimeter 42 and area 84; $\Delta A'B'C'$ is the image of $\Delta ABC$ after the transformation $D_{3/4}$.
a. What is the perimeter of $\Delta A'B'C'$? b. What is the area of $\Delta A'B'C'$?

22. For each figure, tell how many reflections and how many rotations which will carry the figure onto itself.

a.  b.  c.  d.  e. 

f.  g.  h. regular icosagon (twenty sided figure)

23. The letter **R** is graphed at the origin. Write compositions of transformations that would take the original **R** into each of the three transformed **R**s labeled *a*, *b* and *c*.
Note: There is more than one right answer for each of these. Keep it simple.



**STUFF YOU SHOULD KNOW:**

**Properties of transformations**

- Orientation
- Isometries
  - Direct and opposite
- Preserved properties (length, angle measure, orientation, parallelism, etc.)

**STUFF YOU SHOULD KNOW:**

**Vocabulary:**

- Transformation
- Reflection, line of reflection
- Rotation, center of rotation, angle of rotation
- Translation, vector
- Dilation, center of dilation, constant of dilation
- Glide reflection
- Image and pre-image
- Isometry/Rigid motion
- Orientation; direct and opposite isometries
- Symmetry (line and rotation)
- Composition
- Invariant/preserved
- Fixed points
- Congruent
- Regular polygon

**Be able to:**

- Reflect a figure over a given line
- Rotate a figure a given angle about a given point
- Translate a figure along a given vector
- Dilate a figure by a given scale factor from a given center
- Evaluate a composition of transformations
- State a transformation or composition of transformations that will take a given figure onto its image
- Identify symmetries of figures
- Identify fixed (invariant) points of transformations
- State properties of transformations that are invariant (preserved)
- Find perimeters and areas after dilations