

Math 2 – Honors
 Unit 1 – Geometric Transformations
 Unit Review

Name _____
 Date _____ Pd _____

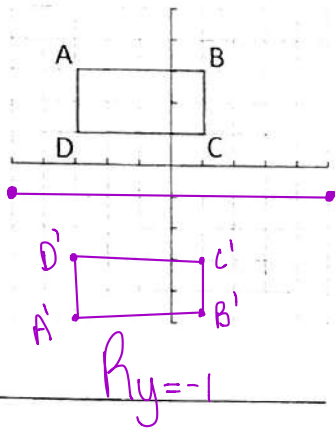
- For each transformation, state the coordinates for each:

	Image of (x, y)	Image of $(1, 4)$	Image of $(-2, 7)$
1. Reflect over y – axis		$(-1, 4)$	$(2, 7)$
2. Reflect over x – axis		$(1, -4)$	$(-2, -7)$
3. Reflect over $y = x$		$(4, 1)$	$(7, -2)$
4. Reflect over $y = -x$		$(-4, -1)$	$(-7, 2)$
5. Rotate 90° clockwise about the origin		$(4, -1)$	$(7, 2)$
6. Rotate 90° counterclockwise about the origin		$(-4, 1)$	$(-7, -2)$
7. Rotate 180° about the origin		$(-1, -4)$	$(2, -7)$
8. Rotate 270° about the origin		$(4, -1)$	$(7, 2)$

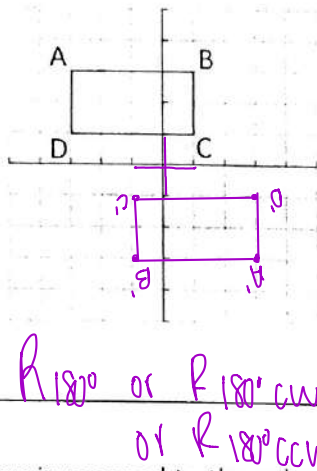
Rules will not be tested

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

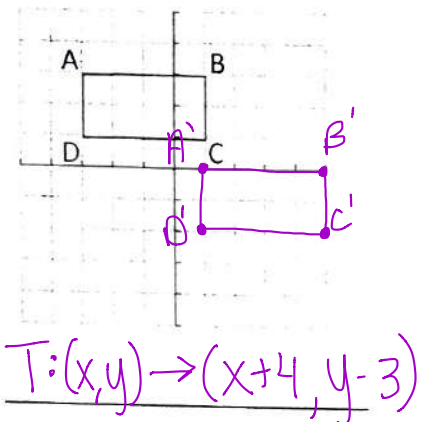
8. Reflect over the line $y = -1$



9. Rotate 180° about the origin
 (use graph paper)



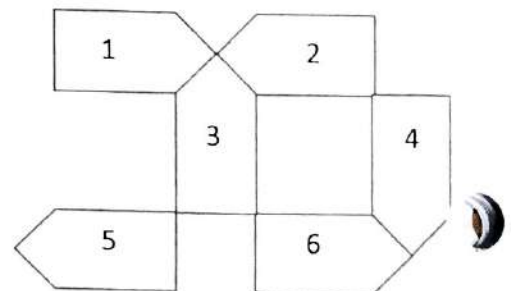
10. Translate right 4 units & down 3 units



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

- Pentagon 1 to Pentagon 3
- Pentagon 5 to Pentagon 6
- Pentagon 2 to Pentagon 5
- Pentagon 1 to Pentagon 2
- Pentagon 4 to Pentagon 6

rotation
 reflection
 translation
 reflection
 rotation



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

$$\begin{matrix} A & B & C \\ \{(7, -4) & (0, 6) & (-2, 3)\} \end{matrix}$$

16. Reflect over the y - axis $A'(-7, -4) B'(0, 6) C'(2, 3)$	18. Rotate 90° counter - clockwise $A'(4, 7) B'(-6, 0) C'(-3, -2)$
17. Reflect over the line $y = -x$ $A'(4, -7) B'(-6, 0) C'(-3, 2)$	19. Dilate by a scale factor $r = \frac{1}{2}$ $A'(3.5, -2) B'(0, 3) C'(-1, 1.5)$

- Answer each of the following.

20. If translation $(5, -3) \xrightarrow{-9} (-4, 0)$, then $(8, 2) \xrightarrow{-9+3} (-1, 5)$

21. If $T: (x, y) \rightarrow (x - 5, y + 2)$ and the point $P(7, -6)$, then find the point F . $(12, -8)$

22. M is reflected over the y - axis. If M is $(6, -1)$, find M' . $(-6, -1)$

23. C is rotated about the origin 90° . If C' is $(-9, 5)$, find C . $(5, 9)$

24. Y is rotated counterclockwise 180° . If the image of Y' is $(0, -3)$ find Y . $(0, 3)$

25. A figure is reflected over the line $y = x$. If the preimage is $(2, 7)$, find the image. $(7, 2)$

26. $\triangle ABC$ has vertices $A(5, -2)$, $B(-4, 0)$, $C(7, 1)$.

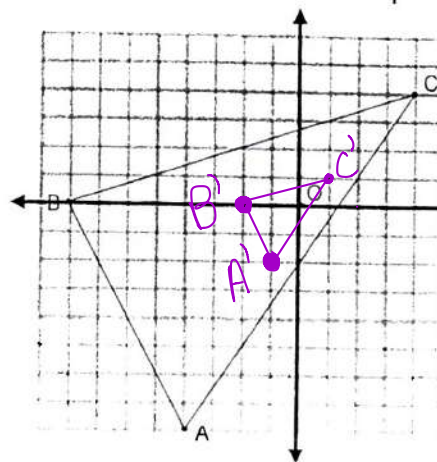
Find the coordinates of the image of the triangle if it is dilated by a scale factor $r = 3$.

$A'(\underline{15}, \underline{-6})$

$B'(\underline{-12}, \underline{0})$

$C'(\underline{21}, \underline{3})$

27. Dilate $\triangle ABC$ using a scale factor $r = \frac{1}{4}$.



$A(-4, -8)$

$B(-8, 0)$

$C(4, 4)$

$A'(-1, -2)$

$B'(-2, 0)$

$C'(1, 1)$

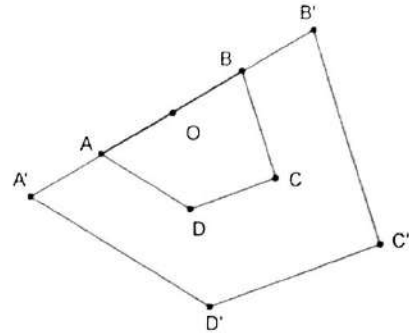
Explain why the two triangles are similar.

Corresponding sides are proportional
Corresponding sides are parallel

28. $ABCD$ is dilated by a scale factor of $r = 2$ to produce $A'B'C'D'$.

The lengths of the segments of the preimage are as follows:

$AB = 6$ $BC = 5$ $CD = 3$ $AD = 4$
 $A'B' = 12$ $B'C' = 10$ $C'D' = 6$ $A'D' = 8$



a. What is the length of $\overline{B'C'}$?

10

b. What is the length of $\overline{A'B'}$?

12

c. If the slope of \overline{CD} is $\frac{1}{3}$, what is the slope of $\overline{C'D'}$?

What allows you to make this conclusion?

$\frac{1}{3}$ ~ Figures have parallel corresponding sides
 $2 \sim 5$

29. $PQRST \sim UWXYZ$ with a scale factor of 2:5. If the perimeter of $UWXYZ$ is 40 inches, what is the perimeter of $PQRST$?

$$\frac{PQRST}{UWXYZ} \frac{2}{5} = \frac{x}{40} \frac{PQRST}{UWXYZ}$$

$$\frac{80}{5} = \frac{5x}{5} \quad X = 16$$

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 up, and then reflect the triangle over the x -axis.

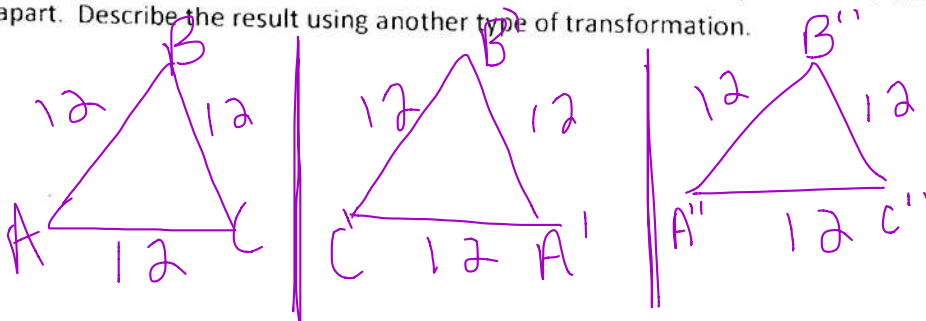
b. Translate a triangle 2 units right and 7 units down, and then rotate 90° clockwise.

c. Rotate a triangle 90 degrees counterclockwise, and then reflect in the line $y = x$.

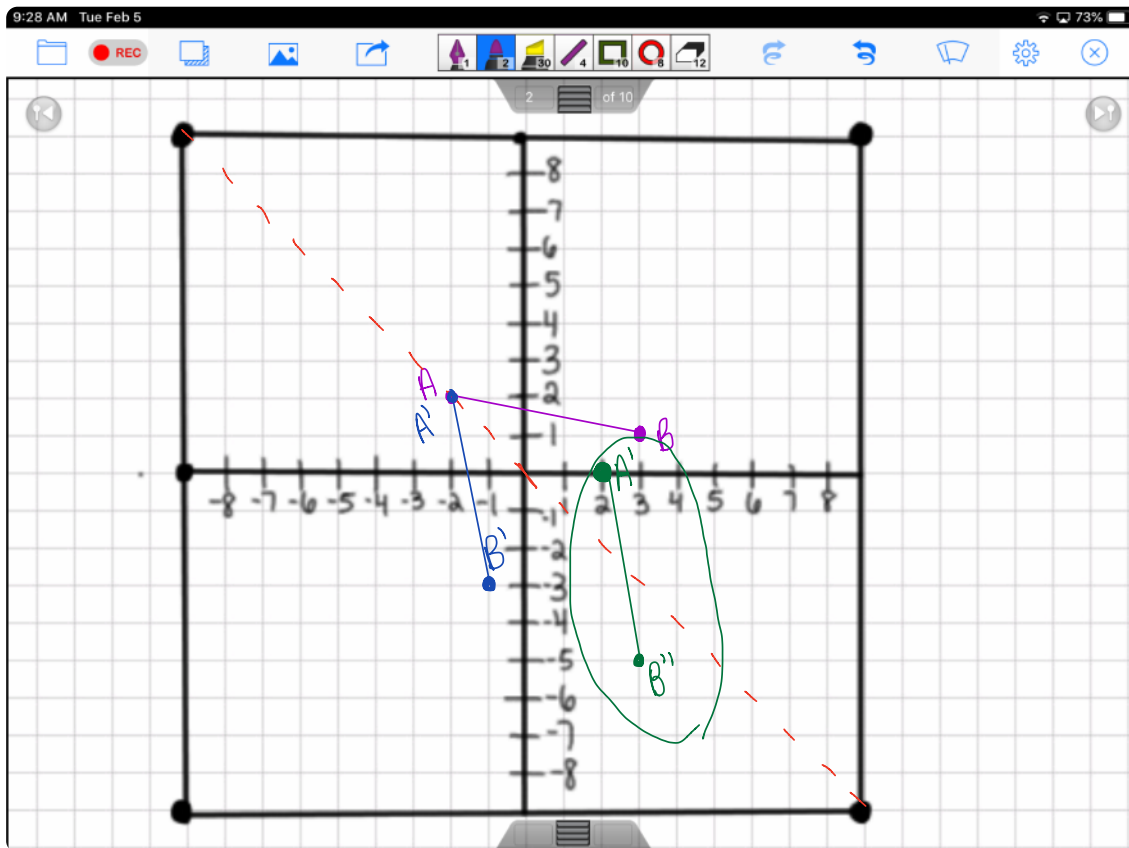
d. Reflect in the line $y = -x$, and then translate right 4 units and down 2 units.

Try doing the composition on graph paper using $A(-2, 2)$
 $B(3, 1)$

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.



Overall translation



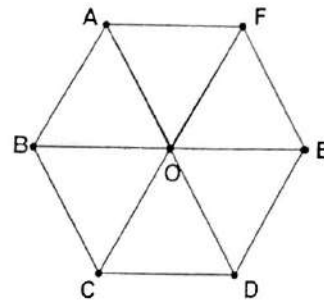
Reflect $y = -x$: 1 prime

Right 4 down 2 : 2 prime

a a1

32. The diagonals of Regular Hexagon $ABCDEF$ form six equilateral triangles as shown.

6 sides $360/6 = 60^\circ = \text{Central Angle}$



Fill in the correct letter after the given transformation:

a. Rotate 60° clockwise: $E \rightarrow$ D

b. Rotate 60° counter-clockwise: $D \rightarrow$ E

c. Rotate 120° clockwise: $F \rightarrow$ D

d. Rotate 60° clockwise: C $\rightarrow B$

e. If a translation maps A to B , then it also maps O to C and E to D.

f. A reflection occurs over \overline{FC} , B maps to D and F maps to E.

Solve:

<p>33. $\frac{2}{x} = \frac{4}{x+3}$</p> <p>$2(x+3) = 4x$</p> <p>$2x+6 = 4x$</p> <p>$6 = 2x$ <u>$x = 3$</u></p>	<p>34. $2x + 6 = 4(x + 8)$</p> <p>$2x + 6 = 4x + 32$</p> <p>$-\frac{26}{2} = \frac{2x}{2}$</p> <p><u>$x = -13$</u></p>	<p>35. $2x + 3y = 6$</p> <p>$y = \frac{-1}{3}x + 2$</p> <p>Desmos</p> <p><u>$(-3, 4)$</u></p>
<p>36. $2x + 3y = 7$</p> <p>$3x - 3y = -12$</p> <p><u>$(-1, 3)$</u></p>	<p>37. $3x + 5y = 6$</p> <p>$2x - 4y = -7$</p> <p><u>$(-\frac{1}{2}, \frac{3}{2})$</u></p>	<p>38. $6x - 8y = 50$</p> <p>$4x + 6y = 22$</p> <p><u>$(7, -1)$</u></p>

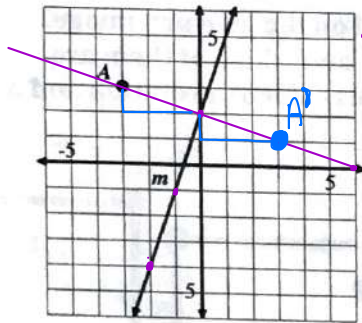
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Topic: Reflecting and rotating points.

On each of the coordinate grids there is a labeled point and line. Use the line as a line of reflection to reflect the given point and create its reflected image over the line of reflection.

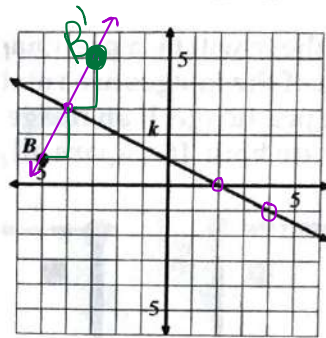
(Hint: points reflect along paths perpendicular to the line of reflection. Use perpendicular slope!)

3.



4.
 Slope of given line
 $= \frac{3}{1}$
 opp. rec $= -\frac{1}{3}$

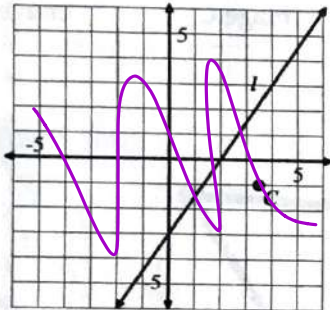
Reflect point **A** over line **m** and label the image **A'**



$m = \frac{1}{2}$
 $m' = -\frac{2}{1}$

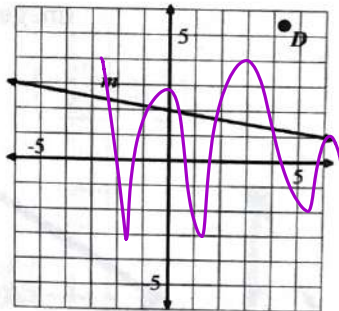
Reflect point **B** over line **k** and label the image **B'**

5.



Reflect point **C** over line **l** and label the image **C'**

6.

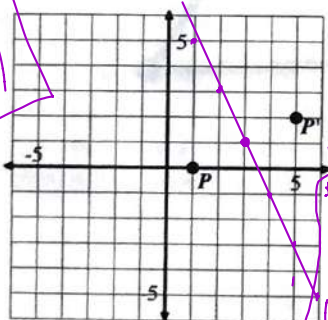


Reflect point **D** over line **m** and label the image **D'**

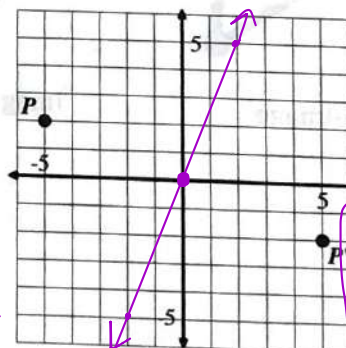
For each pair of point, **P** and **P'** draw in the line of reflection that would need to be used to reflect **P** onto **P'**. Then find the equation of the line of reflection.

7.

$y = -2x + 7$



8.
 Find slope between given points
 $\frac{2}{4} = \frac{1}{2}$
 opp. rec $= -\frac{2}{1}$
 find midpoint of given points
 $P(1, 0) P'(5, 2)$
 $\frac{x_1+x_2}{2}, \frac{y_1+y_2}{2}$
 $(\frac{1+5}{2}, \frac{0+2}{2}) = (3, 1)$ use opp. rec slope from midpoint to create line of reflection on graph



$m = -\frac{4}{10} = -\frac{2}{5}$
 $m' = \frac{5}{2}$
 $P(-5, 2) P'(5, 2)$
 midpoint $= (0, 2)$
 $y = \frac{5}{2}x + 0$
 or
 $y = \frac{5}{2}x$

$$y = mx + b$$

$$y = -2x + b$$

use midpoint to solve for b

$$(3, 1)$$

$$1 = -2(3) + b$$

$$1 = -6 + b$$

$$+6 \quad +6$$

$$b = 7$$

$$y = -2x + 7$$