

Unit 1 Study Guide – Honors Math 2

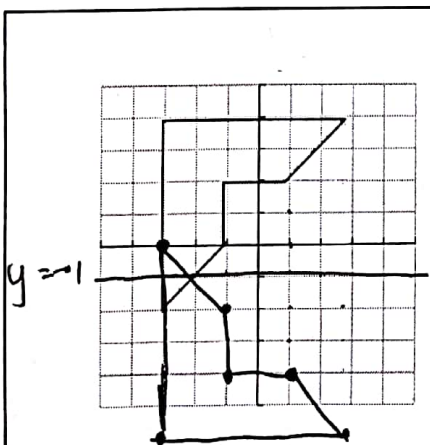
Name: Key

*Remember that anything that we have done in class or HW is fair game for the test! This is to help guide you in your studying, but may not contain every single thing we have covered this unit.

For each transformation, state the coordinates of the image of the point (1, 4) and the general rule for the image of the point (x, y).

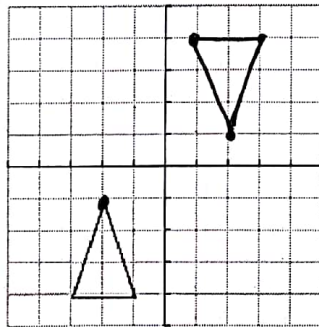
	Algebraic Rule $(x, y) \rightarrow$	Image of (1,4)
1. Reflect over y-axis	$(-x, y)$	$(-1, 4)$
2. Reflect over x-axis	$(x, -y)$	$(1, -4)$
3. Reflect over $y = x$	(y, x)	$(4, 1)$
4. Reflect over $y = -x$	$(-y, -x)$	$(-4, -1)$
5. Rotate 90° about the origin same as CC	$(-y, x)$	$(-4, 1)$
6. Rotate -90° about the origin same as C	$(y, -x)$	$(4, -1)$
7. Rotate 180° about the origin	$(-x, -y)$	$(-1, -4)$
8. Translate right 5 and down 2	$(x+5, y-2)$	$(6, 2)$

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



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

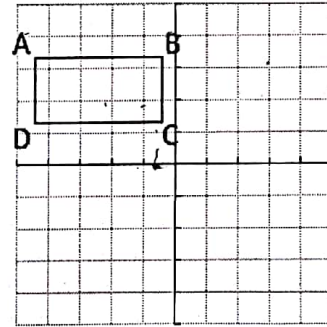
Rule: no rule
for $y = 's$ & $x = 's$



9. Rotate 180° about the origin

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

$(-2, -1) \rightarrow (2, 1)$
 $(-1, -1) \rightarrow (1, 1)$
 $(-1, -2) \rightarrow (1, 2)$



10. a) Reflect over the x-axis, b) then dilated by $\frac{1}{2}$ (about the origin), c) then translate down 2 and left 1.

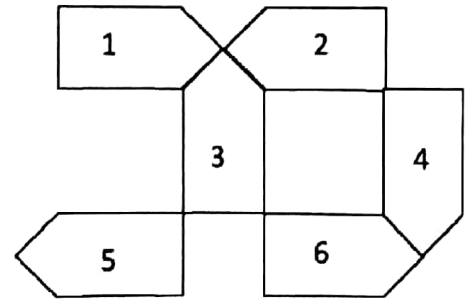
Final rule $(x, y) \rightarrow (\frac{1}{2}x - 1, -\frac{1}{2}y - 2)$

a) $(x, y) \rightarrow (x, -y)$
 b) $(x, -y) \rightarrow (\frac{1}{2}x, -\frac{1}{2}y)$
 c) $(\frac{1}{2}x, -\frac{1}{2}y) \rightarrow (\frac{1}{2}x - 1, -\frac{1}{2}y - 2)$

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

10. Pentagon 1 to Pentagon 3
11. Pentagon 5 to Pentagon 6
12. Pentagon 2 to Pentagon 5
13. Pentagon 1 to Pentagon 2
14. Pentagon 4 to Pentagon 6

Rotation
Reflection
Translation
Reflection
Rotation



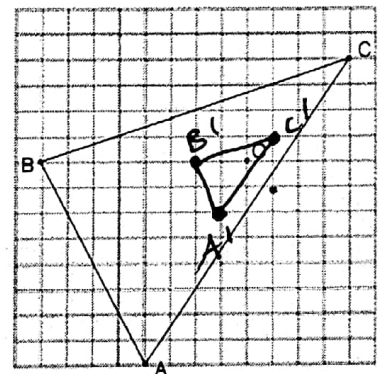
Answer each of the following.

15. If a translation maps $(5, -3) \rightarrow (-4, 0)$, then $(8, 2) \rightarrow (-1, 5)$
16. $(x, y) \rightarrow (x - 5, y + 2)$, if F' is $(7, -6)$, find F . $(12, -8)$
17. M is reflected over the y -axis. If M' is $(6, -1)$, find M . $(-6, -1)$
18. C is rotated about the origin 90° . If C is $(-9, 5)$, find C' . $(9, 5)$
 $(-x, y)$
 same as 90° CC $(-y, x)$
19. Y is rotated about the origin 180° . If the image of Y is $(0, -3)$ find Y' . $(0, 3)$
 $(-x, -y)$
20. A figure is reflected over the line $y = x$. If the preimage is $(2, 7)$, find the image. $(7, 2)$

21. $\triangle ABC$ 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 of 3.

$A'(15, -6)$, $(x, y) \rightarrow (3x, 3y)$
 $B'(-12, 0)$
 $C'(21, 3)$

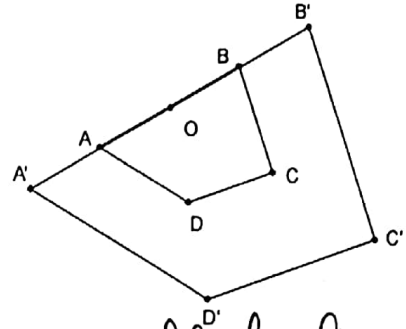
22. Dilate $\triangle ABC$ about point O using magnitude $\frac{1}{4}$.



$B(8, 0) \rightarrow B'(-2, 0)$
 $C(4, 4) \rightarrow C'(1, 1)$
 $A(8, 0) \rightarrow A'(-1, -2)$

23. The image to the right is ABCD and its image when dilated by a factor of 2, A'B'C'D'.

The lengths of the segments of the preimage are as follows:
 $AB = 6$, $BC = 5$, $CD = 3$, $AD = 4$



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

10

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

1/3

What allows you to make this conclusion?

← parallel lines

c. What can you conclude about the angles in these figures?

Congruent. sides? → proportional!!

24. PQRS is dilated by a factor of $5/2$ to obtain image P'Q'R'S'. If the perimeter of P'Q'R'S' is 40 inches, what is the perimeter of PQRS?

$$\frac{5}{2}(40) = 100$$

25. A figure is reflected consecutively across two lines that are parallel and 12 cm apart. Describe the resulting transformation. Be specific.

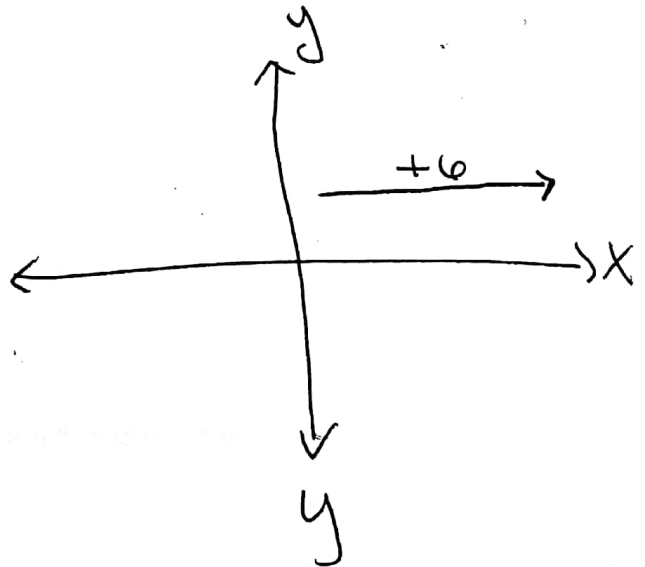
24 cm Translation

26. A figure is reflected consecutively across two lines that intersect to form a 45° angle. Describe the resulting transformation. Be specific.

90° Rotation

27. A figure is translated using the rule $\langle 6, 0 \rangle$ and then reflected in the y-axis. Is this composition of transformations a glide reflection? Explain why or why not.

NO, Movement of right 6 is not parallel to y-axis.



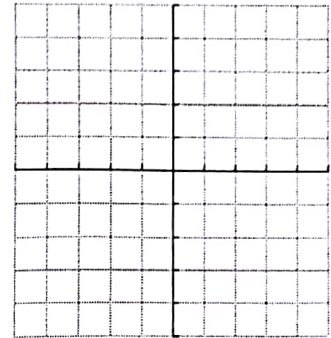
28. For each problem, there is a composition of motions. Using your algebraic rules, come up with a new rule after both transformations have taken place. Then, graph each composition's preimage and image. Use the preimage points, A (-1,1), B (4,3), and C (2, -1).

- a. Translate a triangle 4 units left and 2 units up, and then reflect the triangle over the x-axis. ^(b)

Algebraic Rule: $(x, y) \rightarrow (x-4, -y-2)$

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

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

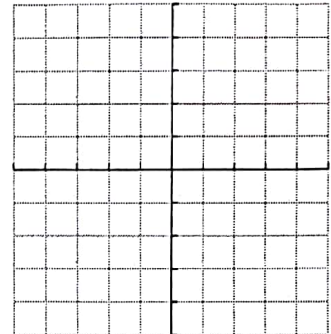


- b. Rotate a triangle 90 degrees counter clockwise, and then reflect in the line $y = x$.

Algebraic Rule: $(x, y) \rightarrow (x, -y)$

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

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

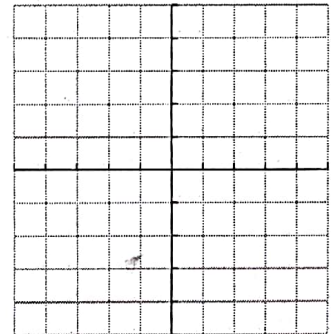


- c. Reflect in the line $y = -x$, and then translate right 4 units and down 2 units.

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

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

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

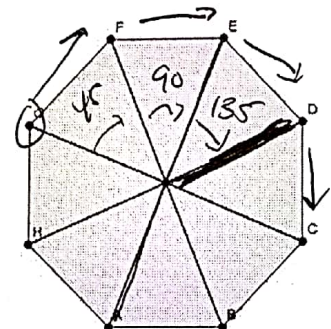


29) In the figure on the right, what is the image of point G after it is reflected over the line EA?

C

30) In the figure on the right, what is the image of point G after it is rotated 135 degrees clockwise about the center?

D



* Isometry & congruent } interchangeable.
* similar & proportional }

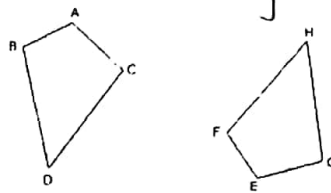
M2 Unit 1 Review: Transformations

Name: Key

I can define and give examples of an isometry.

1) Is the transformation shown at the right an isometry? Why or why not?

Yes, Same size & same shape



Which of the four transformations are *always* isometries? Which are *never* isometries?

Reflection, Rotation, Translation.

↳ Dilation

I can write and explain rules for transformations.

2) Description: Rotate 90 degrees counter clockwise. Rule: $(x, y) \rightarrow (-y, x)$

3) Rule: $(x, y) \rightarrow (-x, y + 6)$ Description: Reflect over y-axis, then translate up 6

4) Description: Reflect the triangle over the x-axis, then translate it 5 units left and 3 units up.

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

I can find the image of a figure via a given transformation.

5) Given the translation $(x, y) \rightarrow (x - 5, y + 2)$, find the image of $F(7, -6)$.

F' : $(2, -4)$

6) K is rotated clockwise about the origin 90° . If K is $(-9, 5)$, find K' .

K' : $(5, 9)$

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

7) $\triangle ABC$ is reflected over the line $y = x$. If the preimage is $A(2, 4)$, $B(5, 3)$, and $C(-3, -6)$, find the image.

A' : $(4, 2)$ B' : $(3, 5)$ C' : $(-6, -3)$

8) $\triangle DEF$ has vertices $D(-2, 4)$, $E(-5, 0)$, and $F(0, -4)$. Find the coordinates of the image of the triangle if it is reflected over the line $x = 1$.

D' : $(4, 4)$ E' : $(7, 0)$ F' : $(2, -4)$

9) Find the image of $\triangle KML$ after it has been reflected over the x-axis, then rotated 90 degrees counter-clockwise.

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

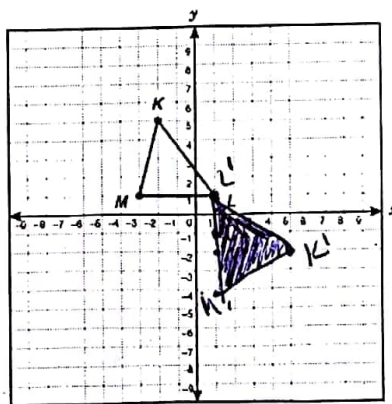
↓

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

$K(-2, 5) \rightarrow K'(5, -2)$

$L(1, 1) \rightarrow L'(1, 1)$

$M(-3, 1) \rightarrow M'(1, -3)$



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

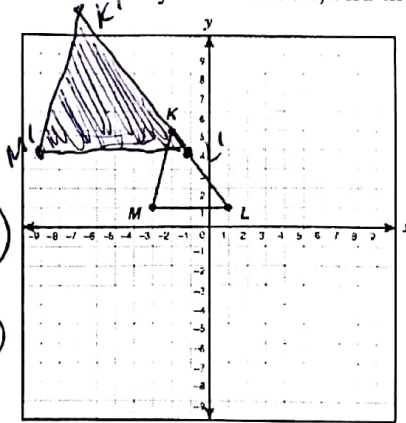
10) Find the image of $\triangle KML$ after it has been dilated by a factor of 2, and then translated via the vector $\langle -3, 2 \rangle$.

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

↓

$$(2x, 2y) \rightarrow (2x-3, 2y+2)$$

Rule: $(x, y) \rightarrow (2x-3, 2y+2)$



$$K(-2, 5) \rightarrow K'(-7, 12)$$

$$L(1, 1) \rightarrow L'(-1, 4)$$

$$M(-3, 1) \rightarrow M'(-9, 4)$$

□ I can work backwards from the image of a figure to find the pre-image.

11) M is reflected over the y -axis. If M' is $(6, -1)$, find M . $(-6, -1)$ $(x, y) \rightarrow (-x, y)$

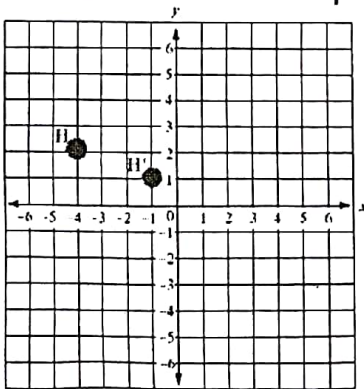
12) If a figure is transformed via the rule $(x, y) \rightarrow (x+1, y-2)$. Find a rule that maps the image *back* to the pre-image.

check $(2, 1) \rightarrow (3, -1)$ $(x, y) \rightarrow (x-1, y+2)$ $(3, -1) \rightarrow (2, 1)$ ✓

□ I can find transformations to describe a given movement and create rules to describe them.

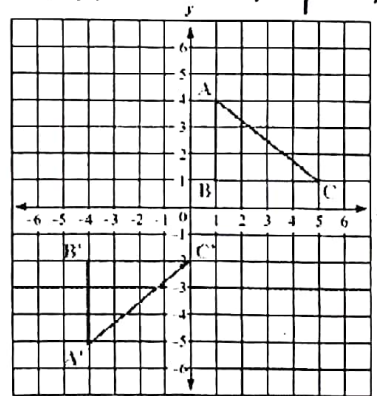
13) Description: Translate Right 3, Down 1

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



14) Description: Reflect over x -axis then Translate Left 5, Down 1

Rule: $(x, y) \rightarrow (x-5, -y-1)$



$$A(1, 4) \rightarrow A'(-4, -5)$$

$$B(1, 1) \rightarrow B'(-4, -2)$$

$$C(5, 1) \rightarrow C'(0, -2)$$

□ I can experiment with transformations outside the coordinate plane.

15) In the figure on the right, what is the image of point G after it is reflected over the line EA ?

C

16) In the figure on the right, what is the image of point G after it is rotated 135 degrees clockwise about the center?

D

