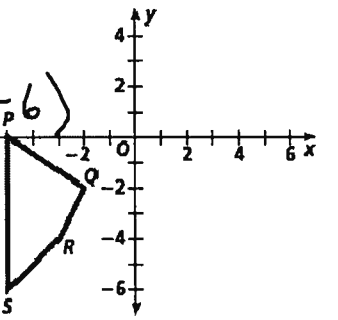
Name _____ Class _____ Date _____

Chapter 9

Find the coordinates of the vertices of the image of *PQRS* for ea transformation. P(-5,0) Q(-2,-2) R(-3 -4) S(-5, -6)



1. reflection across $x = 4$

P'(13,0) Q'(10,-2) R'(11,-4) S'(13,-6)

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

P'(-1,-2) Q'(2,-4) R'(1,-6) S'(-1,-8)

3. rotation of 90° about the point (0, 0)

P'(0,5) Q'(+2,2) R'(+4,-3) S'(+6,-5)

4. dilation with scale factor $\frac{1}{2}$ centered at the origin

P'(-2.5,0) Q'(-1,-1) R'(-1.5,-2) S'(-2.5,-3)

5. glide reflection with glide $(x, y) \rightarrow (x, y+2)$ and reflection across $x = 0$

P'(5,2) Q'(2,0) R'(3,-2) S'(5,-4)

6. translation 6 units left and 3 units up

P'(-11,3) Q'(-8,1) R'(-9,-1) S'(-11,-3)

What transformation has the same effect as each composition of transformations?

7. translation $(x, y) \rightarrow (x, y+3)$ followed by reflection across $x = 2$

Glide reflection

8. translation $(x, y) \rightarrow (x+3, y+6)$ followed by $(x, y) \rightarrow (x-1, y+4)$

translation

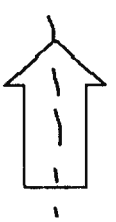
9. reflection across $x = 6$ and then across $x = 2$

translation

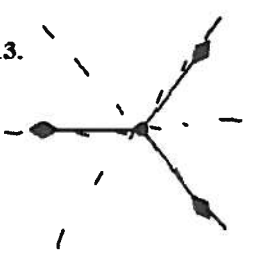
10. reflection across $y = x$ and then across $y = 3x - 1$

rotation

What type of symmetry does each figure have?

12. 

line or reflection

13. 

rotation 120°

line

Name _____ Class _____ Date _____

Chapter Test (continued) **Form A**
Chapter 9

14. Draw four letters of the alphabet that have the indicated symmetry.
a. reflectional symmetry **b.** rotational symmetry

15. When you work a jigsaw puzzle, what transformations can you perform on the pieces? Explain your answer. You may draw sketches to support your written response.

16. Write a rule to describe a reflection across the line $y = x$. $(x, y) \rightarrow (y, x)$

17. Write a rule to describe a 90 degree rotation. $(x, y) \rightarrow (-y, x)$

Find the image of $\triangle LMN$ for a dilation with center (0, 0) and the given scale factor.

18. $L(-1, 2)$, $M(2, 2)$, $N(1, -3)$; scale factor 3

19. $L(2, -3)$, $M(3, 4)$, $N(5, -2)$; scale factor $\frac{1}{4}$

20. $L(-3, -3)$, $M(-3, 3)$, $N(0, 0)$; scale factor 6

21. $L(9, -6)$, $M(0, -5)$, $N(7, -6)$; scale factor $\frac{1}{3}$

A dilation maps $\triangle XYZ$ to $\triangle X'Y'Z'$.

18 / 42

22. $XY = 42$ cm, $YZ = 35$ cm, and $XZ = 56$ cm. If $X'Y' = 18$ cm, find the lengths of the other two sides and the scale factor. $\frac{3}{7}$ $\frac{3}{7} = \frac{Y'Z'}{35}$ $Y'Z' = 15$ $\frac{3}{7} = \frac{X'Z'}{56}$ $X'Z' = 24$

30 / 18

23. $XY = 15$ in., $YZ = 24$ in., and $XZ = 18$ in. If $X'Z' = 30$ in., find the lengths of the other two sides and the scale factor. $\frac{5}{3}$ $X'Y' = 25$ $Y'Z' = 40$

Find the image of each point under a 270° rotation about the origin. $(x, y) \rightarrow (y, -x)$

24. $(-3, -1)$ $(-1, 3)$

25. $(-4, 5)$ $(5, 4)$

26. $(7, -2)$ $(-2, -7)$

Find the image of each point under a 90 degree rotation about the origin. $(x, y) \rightarrow (-y, x)$

27. $(7, 2)$ $(-2, 7)$

28. $(1, 1)$ $(-1, 1)$

29. $(-1, -3)$ $(3, -1)$

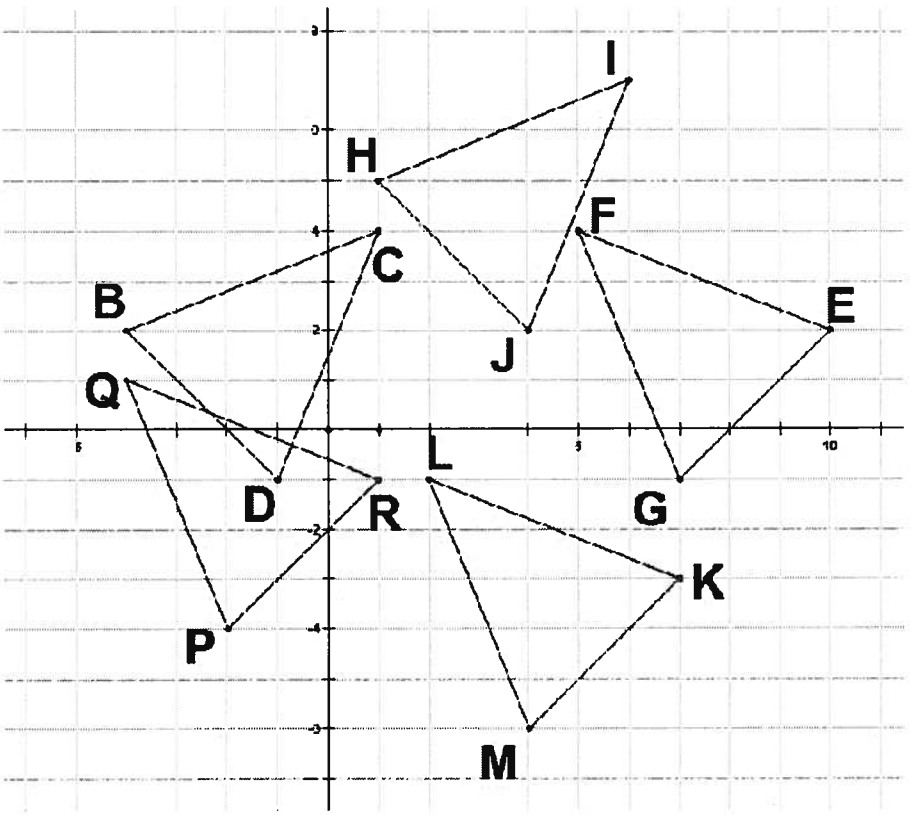
30. Fill in the blanks. ΔBCD is the preimage for all transformations.

a. Δ PQR is a rotation of 90 degrees around center point (0,0).

b. Δ EFG is a reflection over the line x = 3.

c. Δ HIJ is a translation under the rule (x,y) → (x+5 , y+3).

d. Δ MLK is a glide reflection.

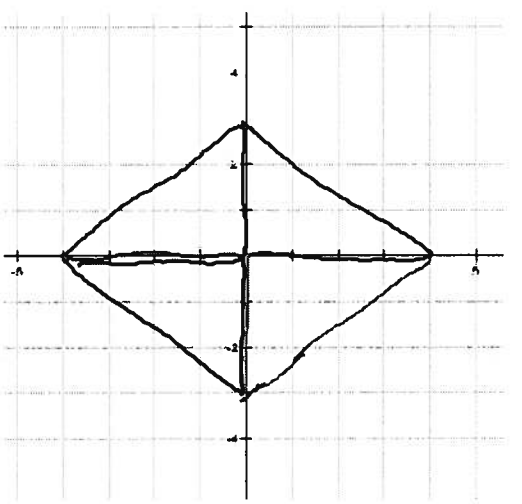


31. Draw the triangle RHM with points R(0, 0), H(0, 3), and M(4, 0). ✓

a. Reflect RHM over the y axis. ✓

b. Reflect RHM over the x axis. ✓

c. Rotate RHM 180° around the origin. ✓

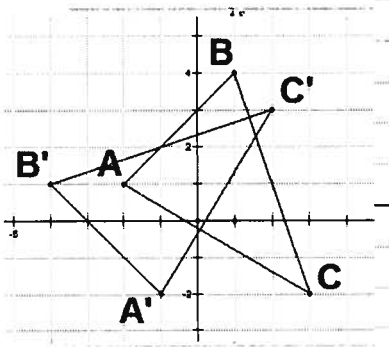


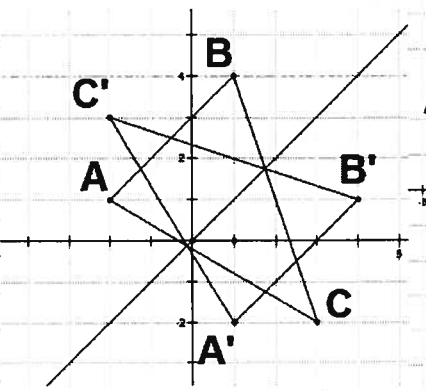
32. Draw triangle A(-2, 1), B(1, 4), and C(3, -2).

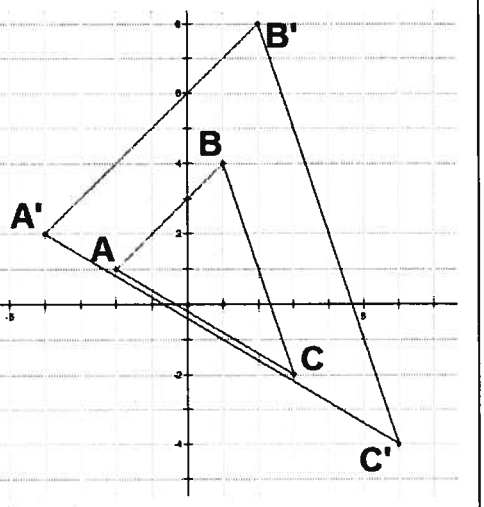
In the first graph rotate ABC 90° about the origin.

In the second graph reflect ABC over the line y = x.

In the third graph dilate ABC with scale factor 2 and center at the orig



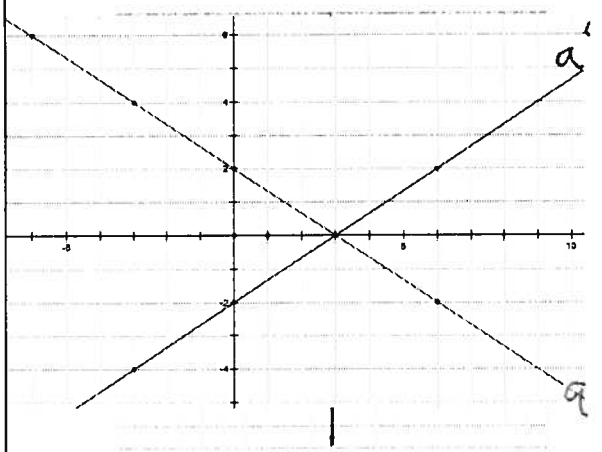


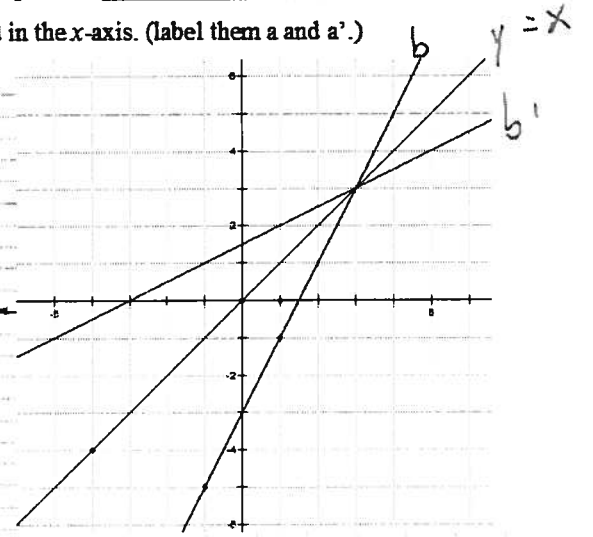


$f(x) = \left(\frac{-2}{3}\right) \cdot x + 2$

33. Write the equation $2x + 3y = 6$ in slope intercept form. _____

Graph the line and the image of the line reflected in the *x*-axis. (label them a and a'.)





34. Write the equation $15 = 5(2x - y)$ in slope intercept form. ____ $g(x) = 2 \cdot x - 3$

Graph the line and the image of the line reflected over the *line* $y = x$. (label them b and b'.)