Geometry B
Chapter 9 Review

Name Key
Date _____ Hour _____

Transformations

Use the translation vector $\vec{u} = \langle 5, -2 \rangle$.

1. What is the image of $A(1, 6)$.
A'(6,4)

2. What is the image of $B(-2, 8)$.
B(3,6)

3. What is the preimage of $C'(0, -3)$.
C(-5,-1)

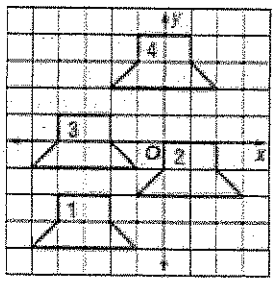
4. What is the preimage of $D'(-5, -10)$.
D(-10,-8)

5. What translation vector would move the image back to its original position?
⟨-5,2⟩

Find the translation vector $\vec{v}$, that maps the figure on the coordinate plane.

6. Figure 1 → Figure 4
⟨3,6⟩

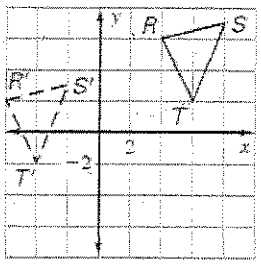
7. Figure 2 → Figure 1
⟨-4,-2⟩



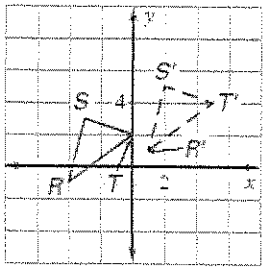
8. Figure 3 → Figure 2
⟨4,-1⟩

9. Figure 4 → Figure 3
⟨-3,3⟩

Find the translation vector, $\vec{v}$, that maps ΔRST onto $\Delta R'S'T'$

10.


⟨-10,-4⟩

11.


⟨5,2⟩

Use the translation $(x, y) \rightarrow (x - 5, y + 8)$.

12. What is the image of $B(4, 2)$?
B'(-1,10)

13. What is the image of $D(-1, 5)$?
D'(-6,13)

14. What is the preimage of $F'(-3, -4)$?
F(2,-12)

15. What is the preimage *of* $H'(7, -5)$?
H(12,-13)

16. A jet begins a flight along a path due north at 300 miles per hour. A wind is blowing due west at 30 miles per hour. Give the component form for the vector that represents the overall path from start to finish.

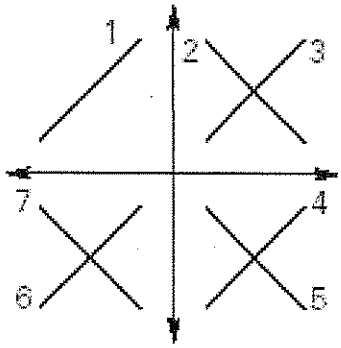
⟨-30,300⟩

17. Which transformations are ALWAYS an isometry? Translation, reflection, rotation

Use the diagram to name the image of segment 1 after the reflection.

18. Reflection in the x-axis — 7

19. Reflection in the y-axis — 2



20. Reflection in the line $y = x$ — 4

21. Reflection in the $y = -x$ — 1

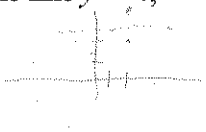
22. Reflection in the y-axis, followed by a reflection in the x-axis — 4

23. Rotation of 180° counter-clockwise — 4

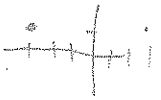
24. Rotation of 90° counter-clockwise — 7

Decide whether the conclusion is *true* or *false*.

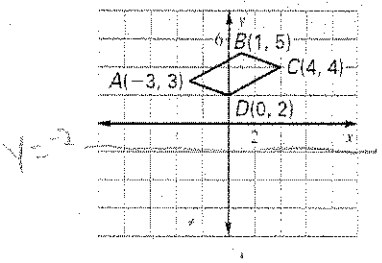
25. If $M(2, 3)$ is reflected in the line $y = 4$, then M' is ~~(6, 3)~~. — F



26. If $N(-3, 1)$ is reflected over the y-axis, then $N'(3, -1)$ — F



27. What are the coordinates of the vertices when the figure is reflected in line $y = -2$.



$A'(-3, -7)$ $B'(1, -9)$ $C'(4, -8)$ $D'(0, -6)$

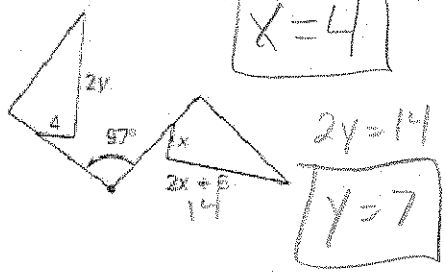
Find the coordinates of the image without using a coordinate plane.

28. $M(3, 4)$ reflected in the line $y = x$. — $M'(4, 3)$

29. $N(-2, 2)$ reflected over the x-axis. — $N'(-2, -2)$

Find the value of x and y in each diagram.

30.

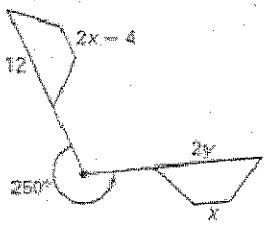


$x = 4$

$2y = 14$

$y = 7$

31.



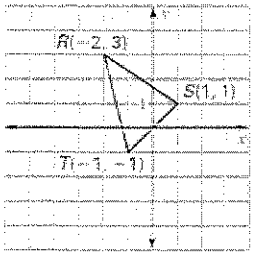
$2y = 12$

$y = 6$

$2x - 4 = x$

$x = 4$

32. $\triangle RST$ is rotated counterclockwise about the origin. Find the new coordinates of each.

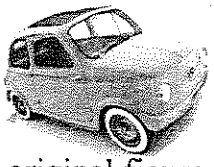


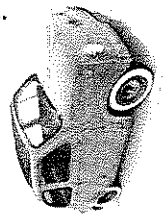
$(-y, x)$ 90°: $R'(-3, -2)$ $S'(-1, 1)$ $T'(1, -1)$

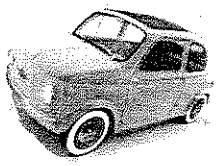
180°: $R''(2, -3)$ $S''(-1, -1)$ $T''(1, 1)$

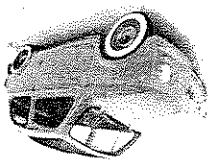
$(y, -x)$ 270°: $R'''(3, 2)$ $S'''(1, -1)$ $T'''(-1, 1)$

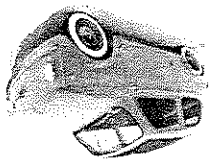
33. Name the transformation.


original figure

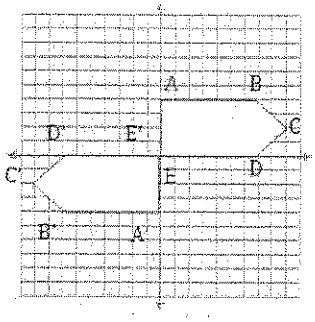
a. 
Rotation

b. 
reflection

c. 
reflection

d. 
rotation

34. What is the change in position from *ABCDE* to *A'B'C'D'E.*



Rotation 180° about origin
$(x,y) \rightarrow (-x,-y)$

In the diagram, $r \parallel s$, $\overline{CD}$ is reflected in line r, and $\overline{C'D'}$ is reflected in line s.

35. A translation maps $\overline{CD}$ onto which segment?

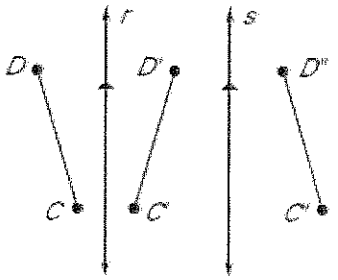
$\overline{C''D''}$

36. Which lines are perpendicular?

$\overline{DD''}$ $\perp r$ & s $\overline{CC''} \perp r$ & s

37. Name two segment parallel to $\overline{CC''}$

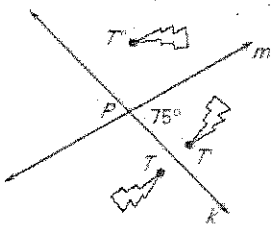
$\overline{DD'}$ $\overline{D'D''}$



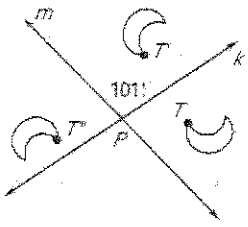
38. If the distance between r and s is 2 inches, what is the length of $\overline{CC''}$?

4

Find the angle of rotation that maps T onto T''.

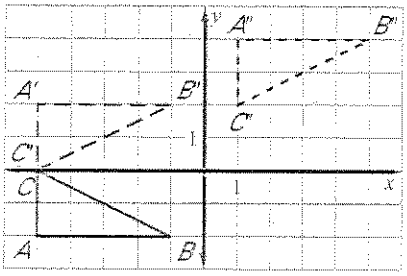
39. 

150° counterclockwise around P

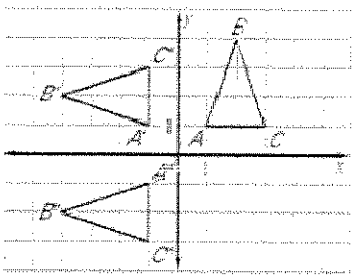
40. 

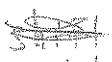
202° counterclockwise around P

Which glide reflection could map triangle ABC to triangle A'B'C'?

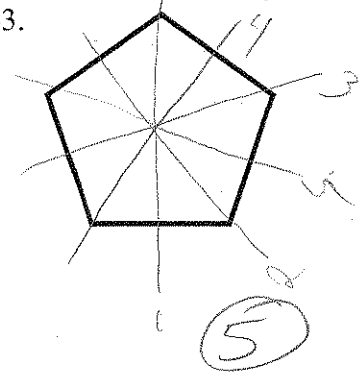
41. 

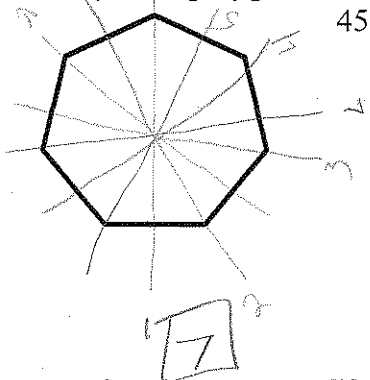
reflect over x-axis then shift <6,2>

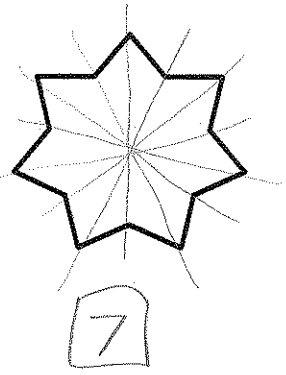
42. 

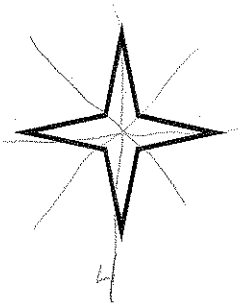
reflect over $y=-x$ then  reflect over x-axis

Determine how many lines of symmetry each polygon has.

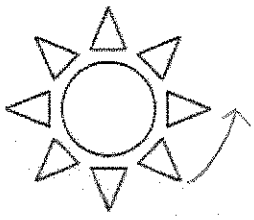
43. 

44. 

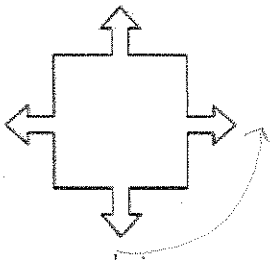
45. 

46. 

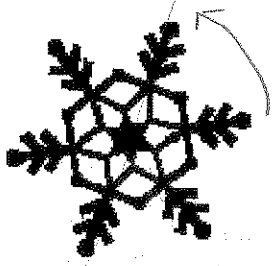
Determine whether the figure has rotational symmetry. If so, describe the rotations that map the figure onto itself.

47. 

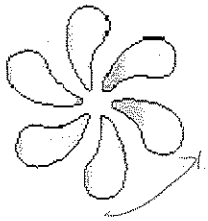
rotational symmetry
45°

48. 

rotational symmetry
90°

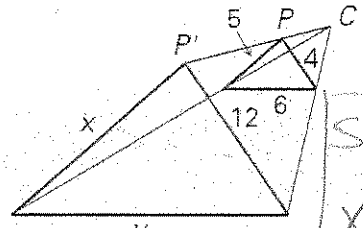
49. 

rotational symmetry
60°

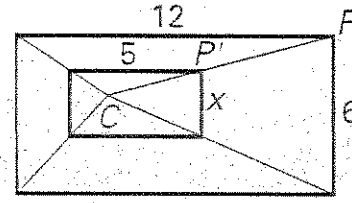
50. 

rotational symmetry
60°

Find the scale factor. Tell whether the dilation is a *reduction* or an *enlargement.* Then find the values of the variables.

51. 

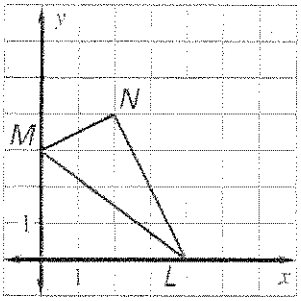
$S.F. = \frac{12}{4} = 3$
$x = 15$
$y = 18$

52. 

$S.F. = \frac{5}{12}$
$x = 6 \cdot \frac{5}{12} = \frac{5}{2}$

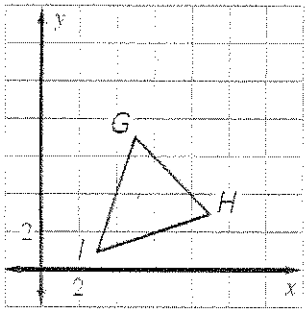
Use the origin as the center of the dilation and the given scale factor to find the coordinates of the vertices of the image of the polygon.

53. $k = 3$



$M'(0,9)$
$N'(6,12)$
$L'(12,0)$

54. $k = \frac{1}{3}$



$I'(1, \frac{1}{3})$
$G'(\frac{5}{3}, \frac{7}{3})$
$H'(3, 1)$