

**Find the coordinates of the vertices of each figure after the given transformation.**

- 1) translation: 5 units right and 4 units down

$N(-3, 1), F(-2, 5), M(0, 5)$

$N'(2, -3), F'(3, 1), M'(5, 1)$

- 2) translation: 2 units left

$Z(3, 4)$

$Z'(1, 4)$

- 3) translation:  $(x, y) \rightarrow (x - 6, y + 1)$

$I(2, 2), P(4, 3), R(5, 0)$

$I'(-4, 3), P'(-2, 4), R'(-1, 1)$

- 4) translation:  $(x, y) \rightarrow (x + 5, y + 2)$

$M(-5, -5), L(-2, -2), E(-3, -5)$

$M'(0, -3), L'(3, 0), E'(2, -3)$

- 5) reflection across the y-axis

$G(-5, -1), W(-5, 3), T(-3, 3)$

$W'(5, 3), T'(3, 3), G'(5, -1)$

- 6) reflection across  $y = 1$

$Y(0, 3)$

$Y'(0, -1)$

- 7) reflection across the x-axis

$T(-3, 4), G(1, 5), J(1, 2)$

$G'(1, -5), J'(1, -2), T'(-3, -4)$

- 8) reflection across  $y = -3$

$Q(1, -5), C(1, -1), T(3, -5)$

$C'(1, -5), T'(3, -1), Q'(1, -1)$

- 9) translation: 4 units left and 2 units down

$T(0, 2), E(1, 5), V(3, 1)$

$T'(-4, 0), E'(-3, 3), V'(-1, -1)$

- 10) translation: 6 units right

$R(-4, 0), Y(-4, 3), S(-1, 0)$

$R'(2, 0), Y'(2, 3), S'(5, 0)$

- 11) rotation  $180^\circ$  about the origin

$U(-5, -2)$

$U'(5, 2)$

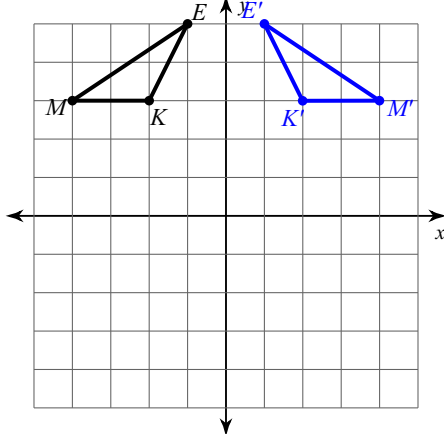
- 12) rotation  $180^\circ$  about the origin

$H(-4, 0), Y(-2, 3), P(-3, 0)$

$H'(4, 0), Y'(2, -3), P'(3, 0)$

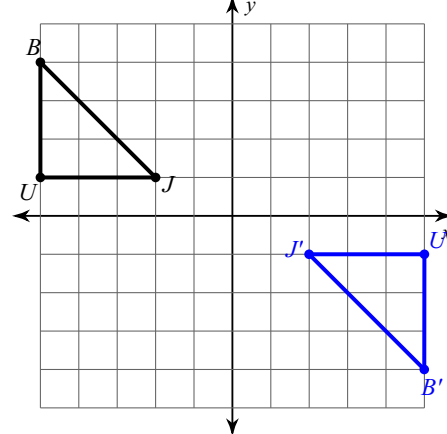
**Write a rule to describe each transformation.**

- 13)



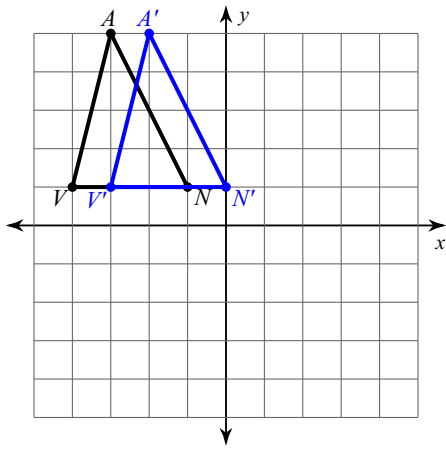
reflection across the y-axis

- 14)



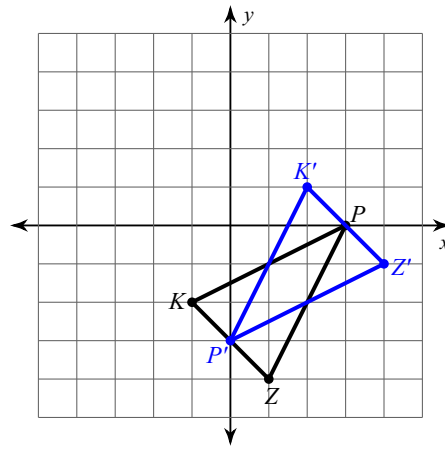
rotation  $180^\circ$  about the origin

15)



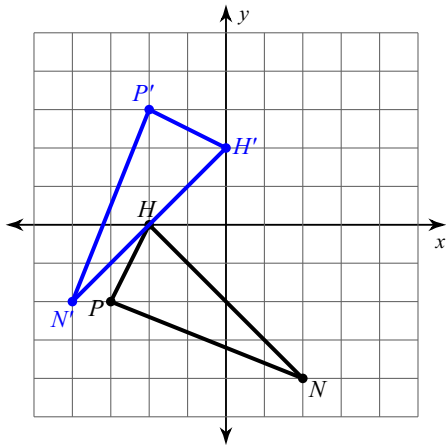
translation:  $(x, y) \rightarrow (x + 1, y)$

16)



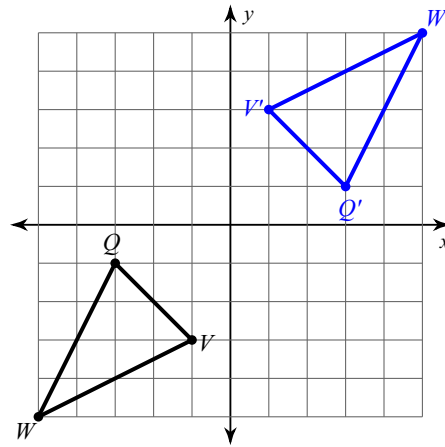
reflection across  $y = -x$

17)



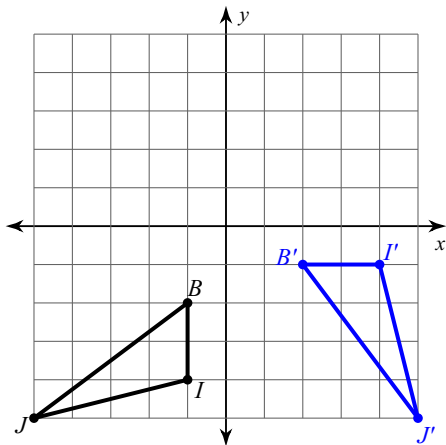
rotation  $90^\circ$  clockwise about the origin

18)



rotation  $180^\circ$  about the origin

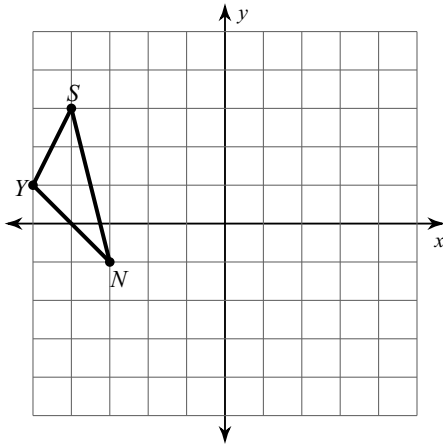
19)



rotation  $90^\circ$  counterclockwise about the origin

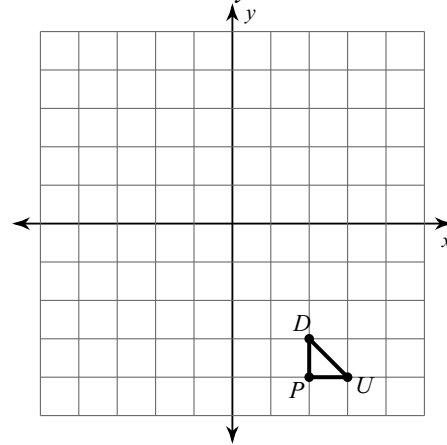
Find the coordinates of the vertices of each figure after the given transformation.

20) reflection across  $x = -2$



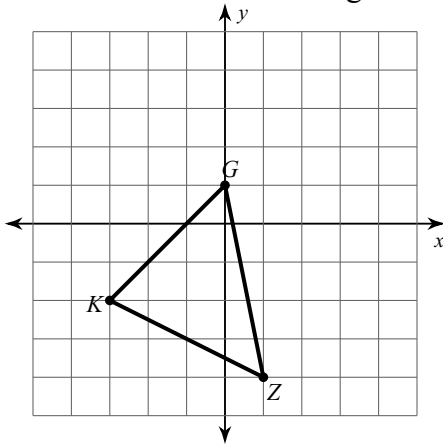
$S'(0, 3), N'(-1, -1), Y'(1, 1)$

21) reflection across  $y = x$



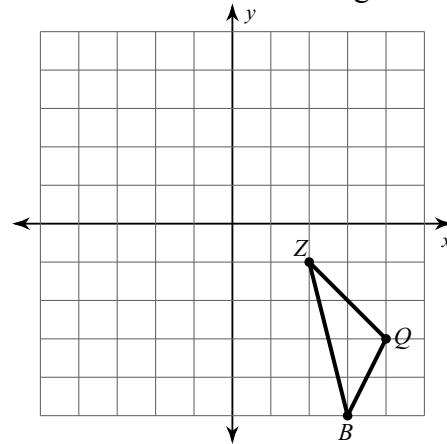
$D'(-3, 2), U'(-4, 3), P'(-4, 2)$

22) rotation  $180^\circ$  about the origin



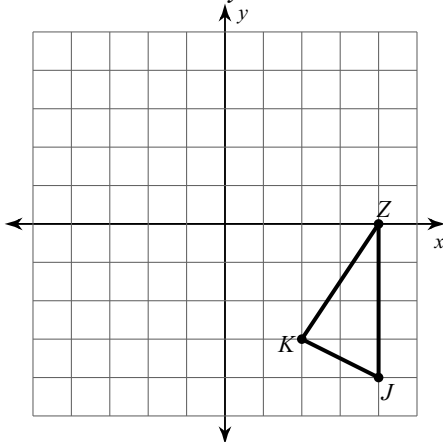
$K'(3, 2), G'(0, -1), Z'(-1, 4)$

23) rotation  $180^\circ$  about the origin



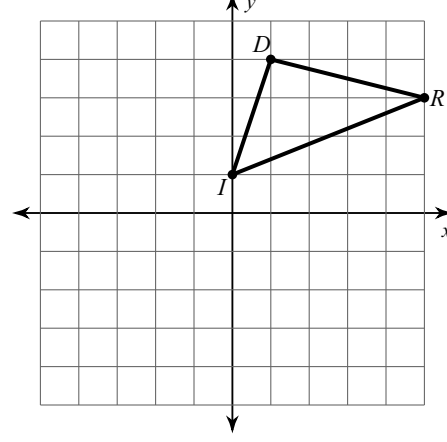
$B'(-3, 5), Z'(-2, 1), Q'(-4, 3)$

24) reflection across  $y = -1$



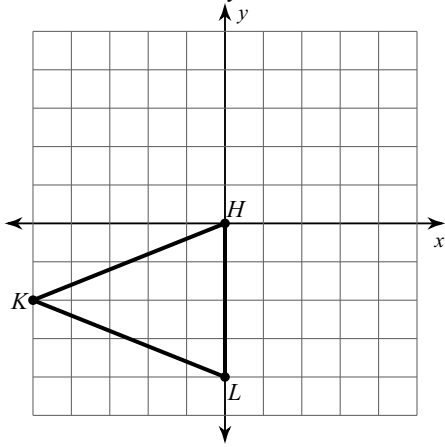
$Z'(4, -2), J'(4, 2), K'(2, 1)$

25) translation: 3 units down



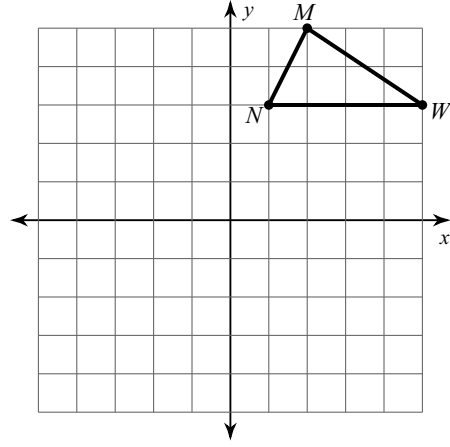
$I'(0, -2), D'(1, 1), R'(5, 0)$

26) reflection across  $y = x$



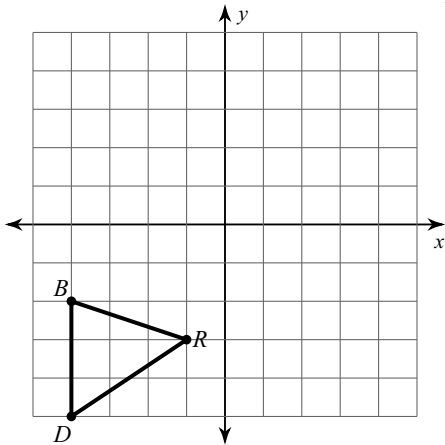
$H'(0, 0), L'(-4, 0), K'(-2, -5)$

27) rotation  $180^\circ$  about the origin



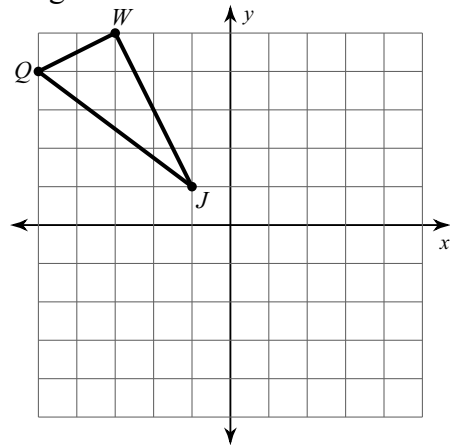
$N'(-1, -3), M'(-2, -5), W'(-5, -3)$

28) translation: 1 unit left and 1 unit up



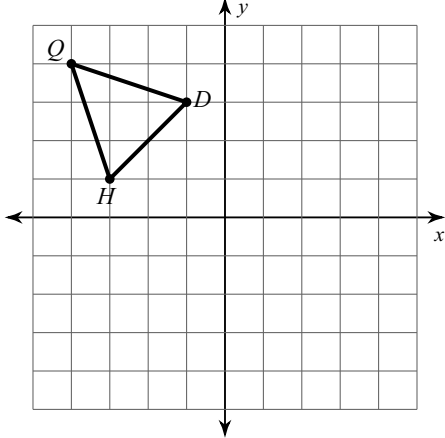
$D'(-5, -4), B'(-5, -1), R'(-2, -2)$

29) rotation  $90^\circ$  counterclockwise about the origin



$Q'(-4, -5), W'(-5, -3), J'(-1, -1)$

30) translation: 1 unit down



$H'(-3, 0), Q'(-4, 3), D'(-1, 2)$