

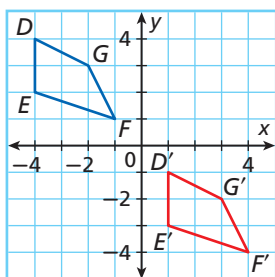
9-2 Translations

EXAMPLE

- Translate the figure with the given vertices along the given vector.

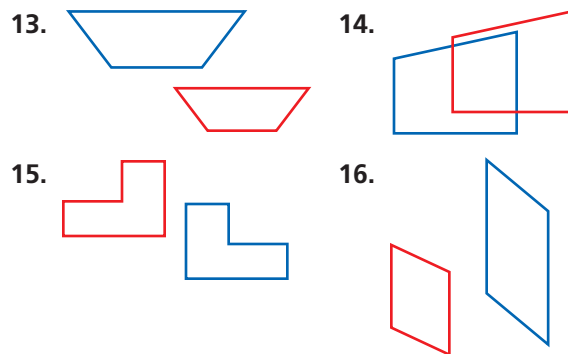
$$D(-4, 4), E(-4, 2), F(-1, 1), G(-2, 3); \langle 5, -5 \rangle$$

To translate along $\langle 5, -5 \rangle$, add 5 to the x -coordinate of each point and add -5 to the y -coordinate of each point. The vertices of the image are $D'(1, -1)$, $E'(1, -3)$, $F'(4, -4)$, and $G'(3, -2)$.



EXERCISES

Tell whether each transformation appears to be a translation.



Translate the figure with the given vertices along the given vector.

- $R(1, -1), S(1, -3), T(4, -3), U(4, -1); \langle -5, 2 \rangle$
- $A(-4, -1), B(-3, 2), C(-1, -2); \langle 6, 0 \rangle$
- $M(1, 4), N(4, 4), P(3, 1); \langle -3, -3 \rangle$
- $D(3, 1), E(2, -2), F(3, -4), G(4, -2); \langle -6, 2 \rangle$

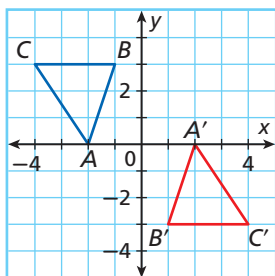
9-3 Rotations

EXAMPLE

- Rotate the figure with the given vertices about the origin using the given angle of rotation.

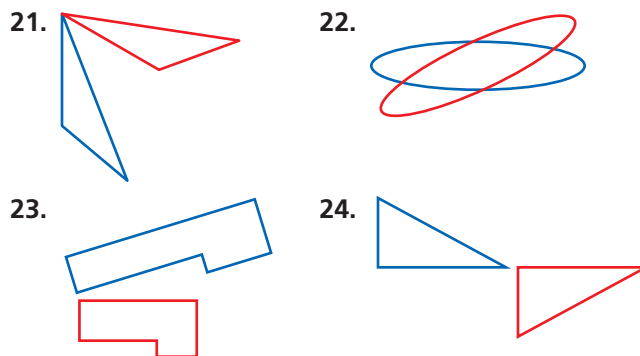
$$A(-2, 0), B(-1, 3), C(-4, 3); 180^\circ$$

To rotate by 180° , find the opposite of the x - and y -coordinate of each point. The vertices of the image are $A'(2, 0)$, $B'(1, -3)$, and $C'(4, -3)$.



EXERCISES

Tell whether each transformation appears to be a rotation.



Rotate the figure with the given vertices about the origin using the given angle of rotation.

- $A(1, 3), B(4, 1), C(4, 4); 90^\circ$
- $A(1, 3), B(4, 1), C(4, 4); 180^\circ$
- $M(2, 2), N(5, 2), P(3, -2), Q(0, -2); 90^\circ$
- $G(-2, 1), H(-3, -2), J(-1, -4); 180^\circ$