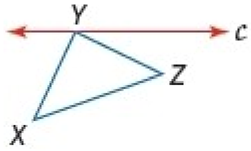
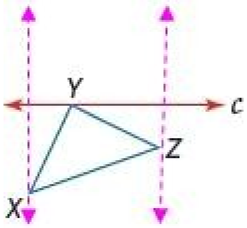
Mid-Chapter Quiz: Lessons 9-1 through 9-3

Copy the figure and the given line of reflection. Then draw the reflected image in this line using a ruler.

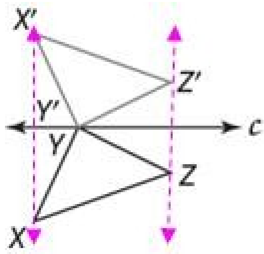
1. 

SOLUTION:

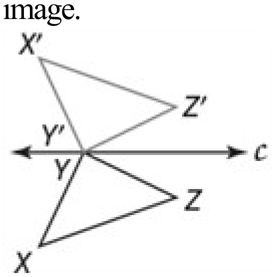
Step 1: Draw a line through each vertex that is perpendicular to line *c*.



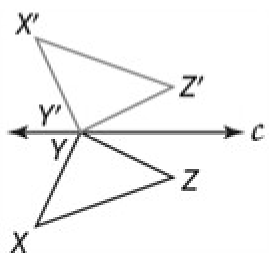
Step 2: Measure the distance from point *X* to the line *c*. Then locate *X*' the same distance from line *c* on the opposite side.

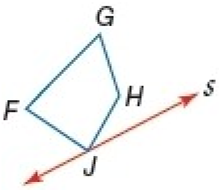


Step 3: Repeat Step 2 to locate points *Y*' and *Z*'. Then connect the vertices, *X*', *Y*', and *Z*' to form the reflected image.



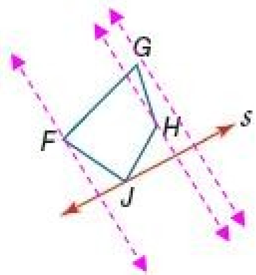
ANSWER:



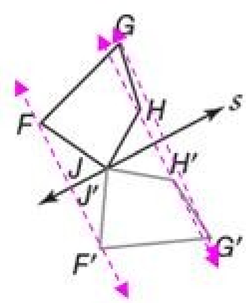
2. 

SOLUTION:

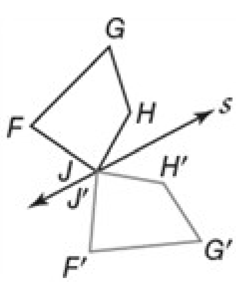
Step 1: Draw a line through each vertex that is perpendicular to line *s*.



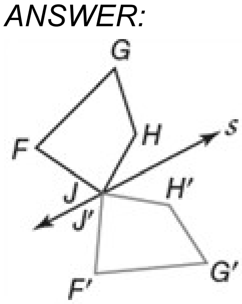
Step 2: Measure the distance from point *F* to the line *s*. Then locate *F*' the same distance from line *s* on the opposite side.



Step 3: Repeat Step 2 to locate points *G*' and *H*'. Then connect the vertices, *J*', *F*', *G'*, and *H*' to form the reflected image.



ANSWER:



Graph each figure and its image after the specified reflection.

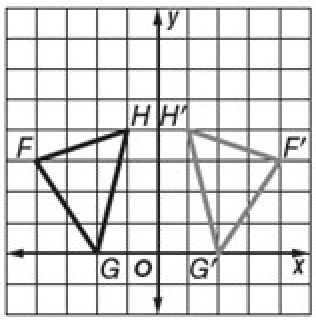
3. ΔFGH has vertices $F(–4, 3)$, $G(–2, 0)$, and $H(–1, 4)$; in the y-axis

SOLUTION:

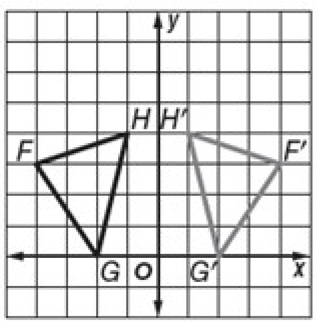
To reflect over the y-axis, multiply the x-coordinate of each vertex by –1.

$(x, y) \rightarrow (–x, y)$
$F(–4, 3) \rightarrow F'(4, 3)$
$G(–2, 0) \rightarrow G'(2, 0)$
$H(–1, 4) \rightarrow H'(1, 4)$

Plot the points. Then connect the vertices, F', G', and H' to form the reflected image.



ANSWER:



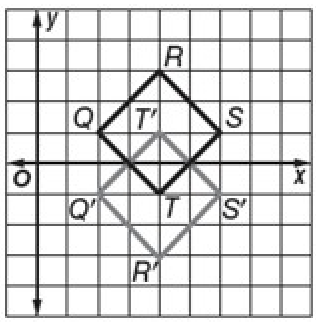
4. rhombus *QRST* has vertices *Q*(2, 1), *R*(4, 3), *S*(6, 1), and *T*(4, –1); in the *x*-axis

SOLUTION:

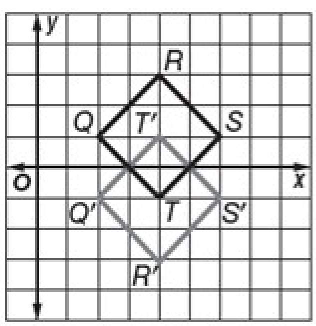
To reflect over the x-axis, multiply the y-coordinate of each vertex by -1.

$(x, y) \rightarrow (-x, y)$
$Q(2, 1) \rightarrow Q'(2, -1)$
$R(4, 3) \rightarrow R'(4, -3)$
$S(6, 1) \rightarrow S'(6, -1)$
$T(4, -1) \rightarrow T'(4, 1)$

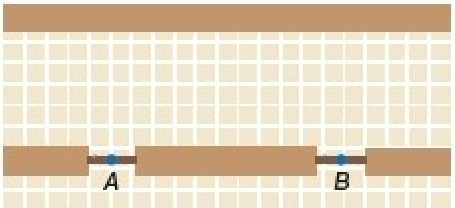
Plot the points. Then connect the vertices, *Q*', *R*', *S*', and *T*' to form the reflected image.



ANSWER:



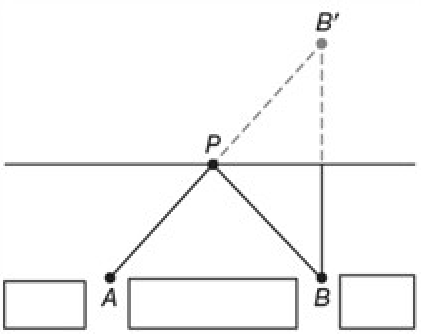
5. **CLUBS** The drama club is selling candy during the intermission of a school play. Locate point *P* along the wall to represent the candy table so that people coming from either door *A* or door *B* would walk the same distance to the table.



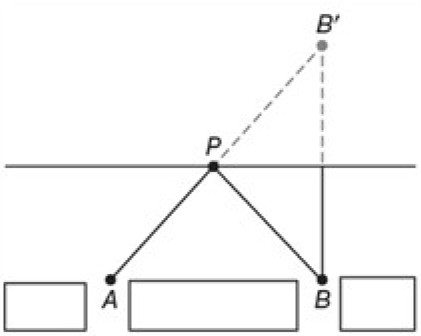
SOLUTION:

Point *P* is along the wall and must be equidistant from points *A* and *B*.

Step 1: Use the reflection of point *B* in the line (wall) to locate *B*'.
Step 2: Draw line *AB*′.
Step 3: *P* is located at the intersection of *AB*′ and the wall.



ANSWER:



Graph each figure and its image after the specified translation.

6. ΔABC with vertices $A(0, 0)$, $B(2, 1)$, $C(1, –3)$; $\langle 3, -1 \rangle$

SOLUTION:

Translation along $\langle 3, -1 \rangle$:

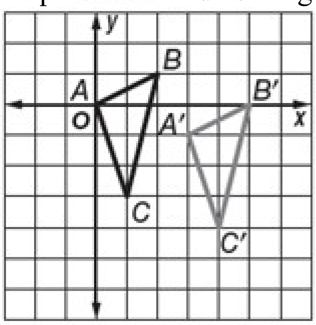
$(x, y) \to (x + 3, y - 1)$

$(0, 0) \to (3, -1)$

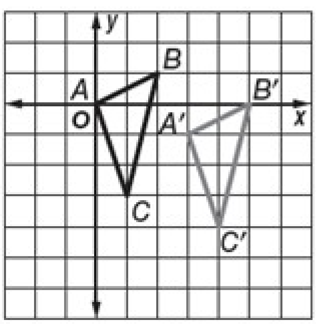
$(2, 1) \to (5, 0)$

$(1, -3) \to (4, -4)$

Graph ΔABC and its image.



ANSWER:



7. rectangle *JKLM* has vertices $J(-4, 2)$, $K(-4, -2)$, $L(-1, -2)$, and $M(-1, 2)$; $\langle 5, -3 \rangle$

SOLUTION:

Translation along $\langle 5, -3 \rangle$:

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

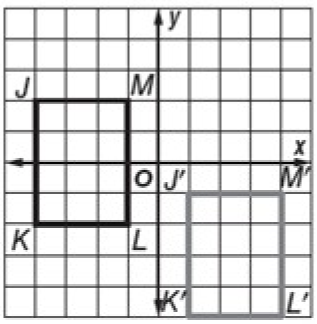
$(-4, 2) \rightarrow (1, -1)$

$(-4, -2) \rightarrow (1, -5)$

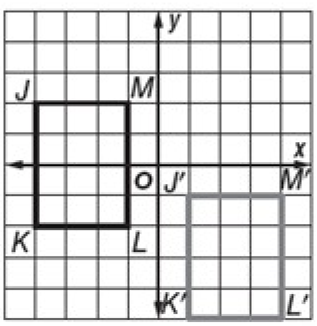
$(-1, -2) \rightarrow (4, -5)$

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

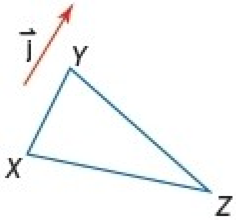
Graph rectangle *JKLM* and its image.



ANSWER:



Copy the figure and the given translation vector. Then draw the translation of the figure along the translation vector.

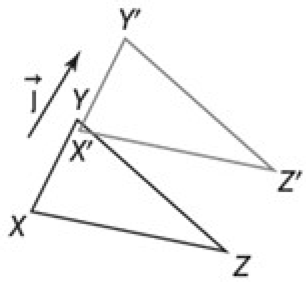
8. 

SOLUTION:

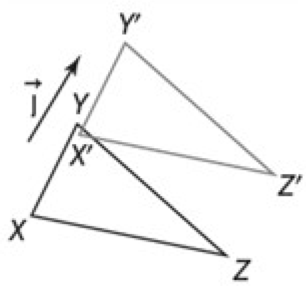
Step 1: Draw a line through each vertex parallel to vector $\vec{j}$.

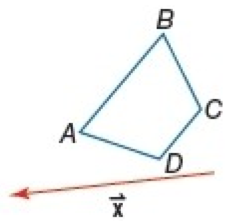
Step 2 : Measure the length of vector $\vec{j}$. Locate point X' by marking off this distance along the line through vertex X, starting at X and in the same direction as the vector.

Step 3: Repeat Step 2 to locate points Y' and Z'. Then connect vertices X', Y', and Z' to form the translated image.



ANSWER:



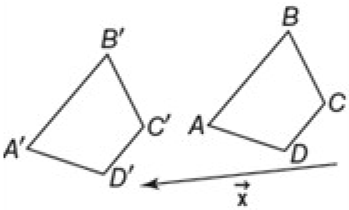
9. 

SOLUTION:

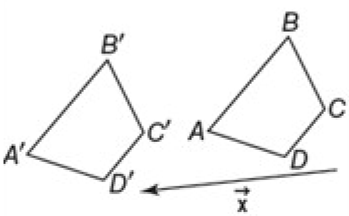
Step 1: Draw a line through each vertex parallel to vector $\vec{x}$.

Step 2 : Measure the length of vector $\vec{x}$. Locate point A' by marking off this distance along the line through vertex A, starting at A and in the same direction as the vector.

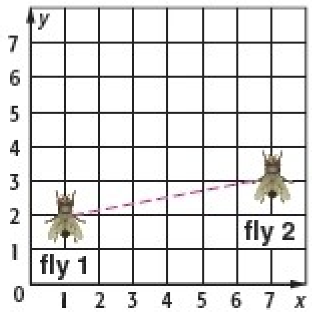
Step 3: Repeat Step 2 to locate points B', C' , and D'. Then connect vertices A', B', C', and D' to form the translated image.



ANSWER:



10. **COMICS** Alex is making a comic. He uses graph paper to make sure the dimensions of his drawings are accurate. If he draws a coordinate plane with two flies as shown below, what vector represents the movement from fly 1 to fly 2?



SOLUTION:

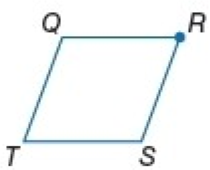
Fly 1 moved 6 units right and then 1 unit up to reach Fly 2's position. So, the translation vector should be $\langle 6,1 \rangle$.

ANSWER:

$\langle 6,1 \rangle$.

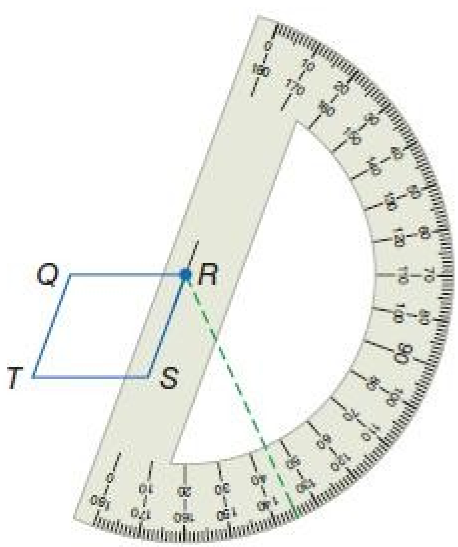
Copy each polygon and point *R*. Then use a protractor and ruler to draw the specified rotation of each figure about point *R*.

11. 45°

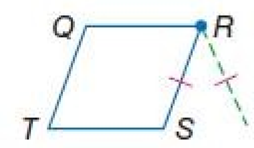


SOLUTION:

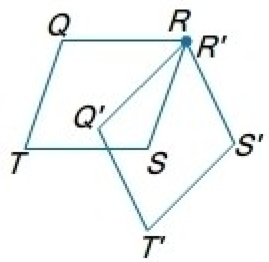
Step 1: Draw a 45º angle using *RS*.



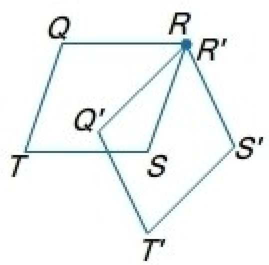
Step 2: Locate *S*' on the new line such that *RS'* equals *RS.*



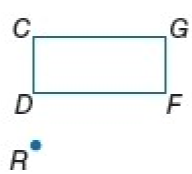
Step 3: Repeat Steps 1-2 for vertices *Q* and *T* and draw the new parallelogram.



ANSWER:

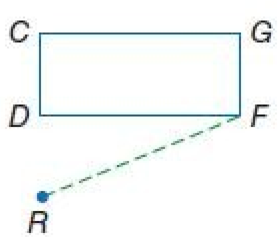


12. 60°

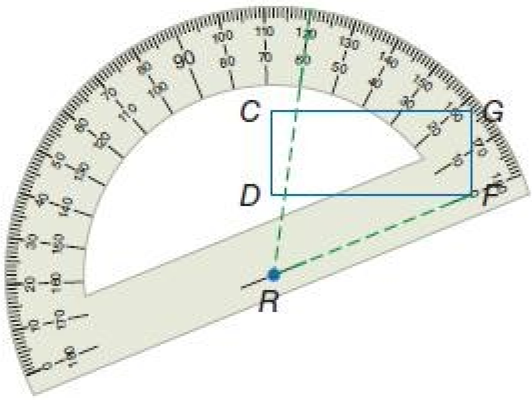


SOLUTION:

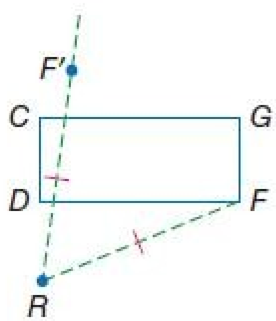
Step 1: Draw a segment from *F* to *R*.



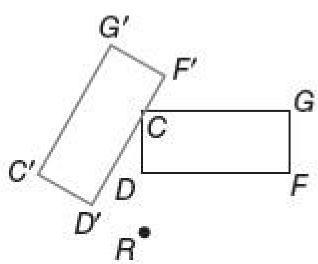
Step 2: Draw a 60° angle using *FR*.



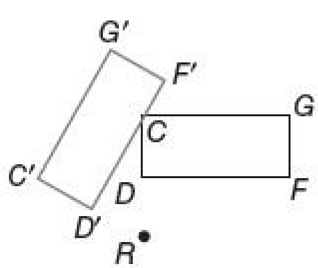
Step 3: Use a ruler to draw *F'* such that *FR* = *F'R*.



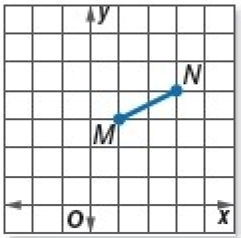
Step 4: Repeat Steps 1-3 for vertices *C*, *D*, and *G* to complete the new rectangle.



ANSWER:



13. **MULTIPLE CHOICE** What is the image of point M after a rotation of 90° about the origin?



A (–3, 1)
B (–3, –1)
C (–1, –3)
D (3, 1)

SOLUTION:

To rotate a point 90° clockwise about the origin, multiply the y-coordinate of each vertex by –1 and interchange. The coordinates of point M are (1, 3).

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

$(1, 3) \to (-3, 1)$

So, the correct option is A.

ANSWER:

A

Graph each figure and its image after the specified rotation.

14. ΔRST has vertices $R(-3, 0)$, $S(-1, -4)$, and $T(0, -1)$; 90°

SOLUTION:

To rotate a point 90° counterclockwise about the origin, multiply the y-coordinate of each vertex by –1 and interchange.

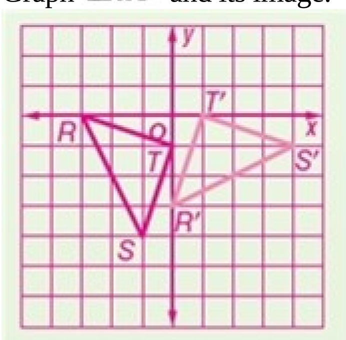
$(x, y) \rightarrow (-y, x)$

$(-3, 0) \rightarrow (0, -3)$

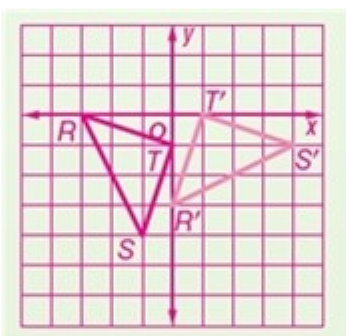
$(-1, -4) \rightarrow (4, -1)$

$(0, -1) \rightarrow (1, 0)$

Graph ΔRST and its image.



ANSWER:



15. square *JKLM* has vertices *J*(–1, 2), *K*(–1, –2), *L*(3, –2), and *M*(3, 2); 180°

SOLUTION:

To rotate a point 180° counterclockwise about the origin, multiply the *x*- and *y*-coordinate of each vertex by –1.

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

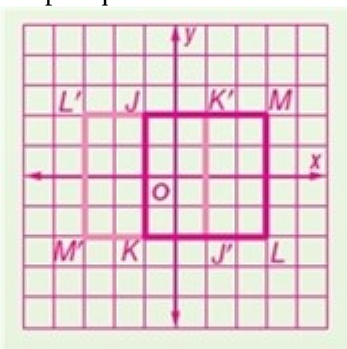
$(-1, 2) \rightarrow (1, -2)$

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

$(3, -2) \rightarrow (-3, 2)$

$(3, 2) \rightarrow (-3, -2)$

Graph square *JKLM* and its image.



ANSWER: