Drawing Shapes on a Coordinate Grid
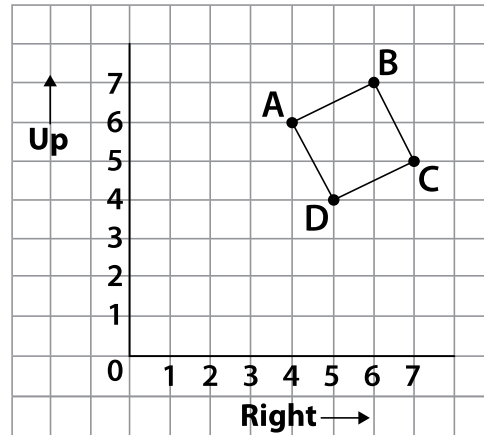
Quick Review

At Home At School

To describe the position of a shape on a grid, we use **ordered pairs**. The numbers in an ordered pair are called **coordinates**.

The first coordinate tells how far you move right. The second coordinate tells how far you move up.
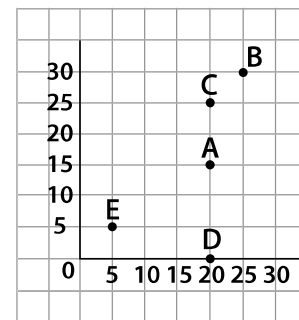
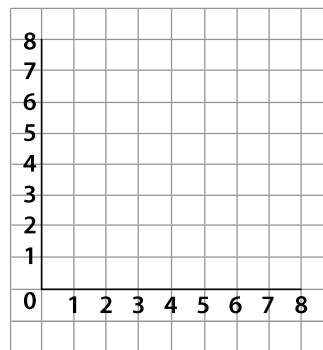The point A has coordinates (4, 6). We write: A (4, 6)

Try These

1. Match each ordered pair with a letter on the grid.

  a) (20, 15) _____

  b) (25, 30) _____

  c) (5, 5) _____

  d) (20, 0) _____

  e) (20, 25) _____

2. a) Plot each point on the grid.
  A (2, 3)
  B (5, 7)
  C (7, 7)
  D (8, 5)
  E (6, 2)

  b) Join the points in order. Then join E to A.
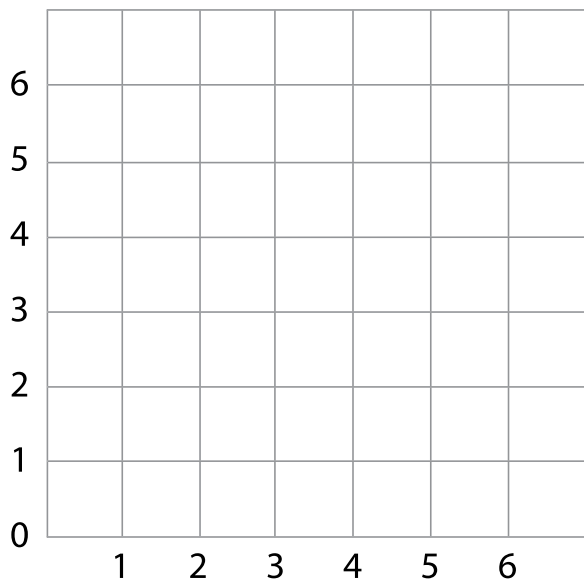
  What figure have you drawn? _____

Play this game with a partner.
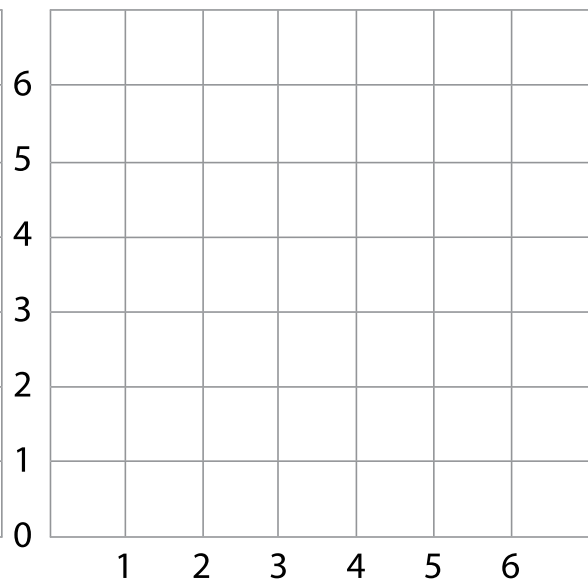You will need a number cube.

Take turns:
➤ Roll the number cube twice.
   Use the numbers rolled as an ordered pair.
   Plot the point on your grid.
➤ If you roll an ordered pair which has already been plotted, you miss your turn.
➤ The first player to plot 4 points that form a rectangle is the winner.

Player 1   **Player 2**

Stretch Your Thinking

Write the coordinates of each point on your game grid.

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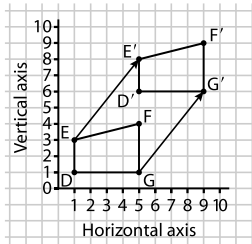Write the coordinates of each point on your partner's grid.
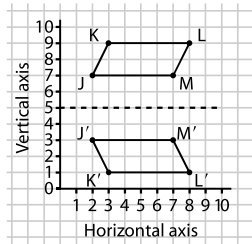
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Transformations on a Coordinate Grid

At Home
At School

Quick Review

We can show transformations on a coordinate grid.
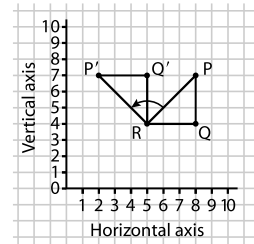
➤ **Translation**

➤ **Reflection**

➤ **Rotation**

Quadrilateral DEFG was translated 4 squares right and 5 squares up.

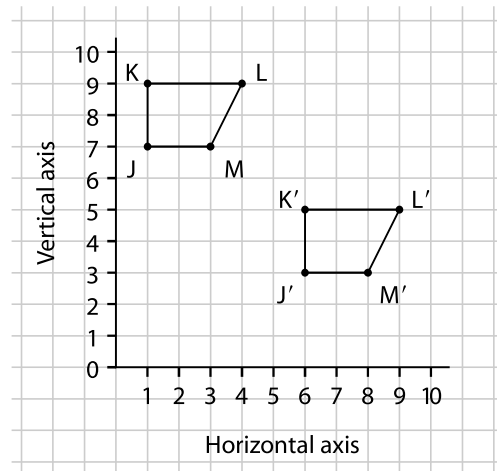Quadrilateral JKLM was reflected in a horizontal line through the vertical axis at 5.

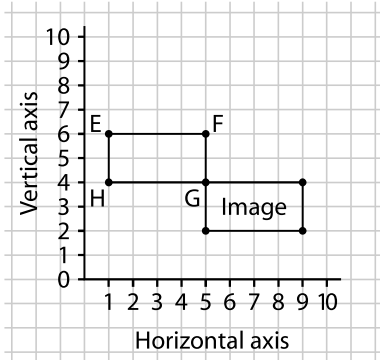Triangle PQR was rotated 90° counterclockwise about vertex R.

Try These

1. **a)** Identify this transformation.

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b) Write the coordinates of the vertices of the quadrilateral and its image.
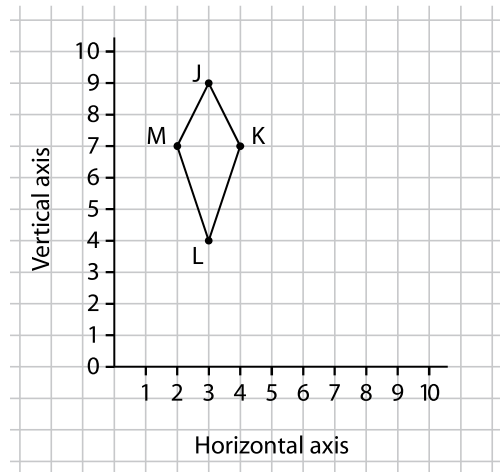
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1. Describe as many different transformations as you can that would move Rectangle EFGH onto the image.
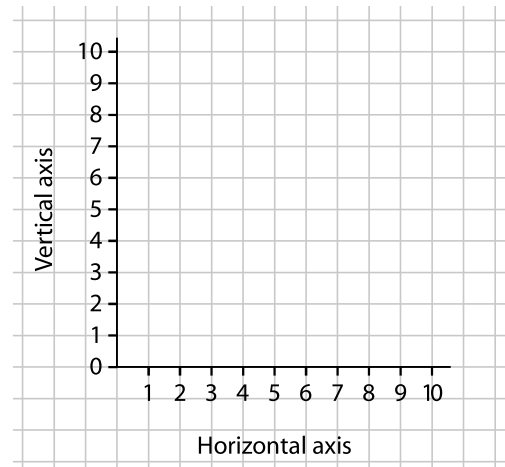

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2. **a)** Draw the image of Kite JKLM after a 90° turn clockwise about vertex L. Label the vertices of the image.

   b) Write the coordinates of each vertex.

   _____

   c) Write the coordinates of the vertices of the image.

   _____

Stretch Your Thinking

Draw a shape for which a translation image could also be a reflection image.
Draw the image. Write the coordinates of the shape and the image.

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Successive Transformations

At Home
At School

Quick Review

The same transformation can be applied to a shape more than once.

➤ When a shape is transformed 2 or more times, we say the shape undergoes **successive transformations**. Quadrilateral A″B″C″D″ is the image of Quadrilateral ABCD after 2 successive translations.
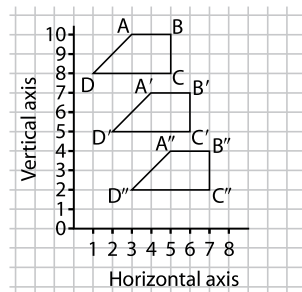
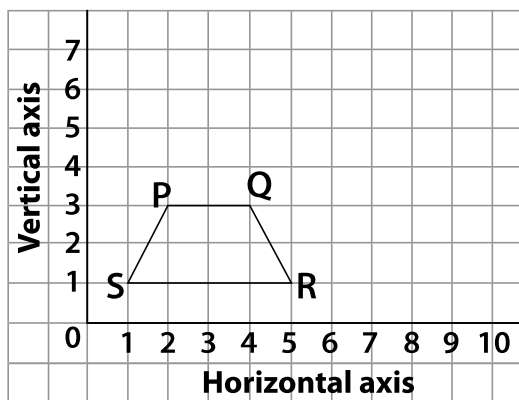The same is true for rotations and reflections.

Try These

1. Make 2 successive translations of 3 squares right and 1 square up.
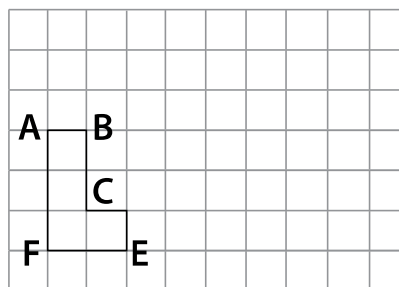
2. Rotate Trapezoid PQRS 180° about vertex Q.

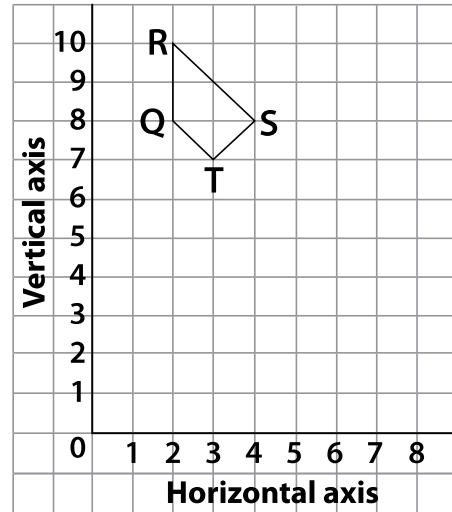Then rotate the image 180° about vertex S′.

Draw and label each image.

1. Translate the quadrilateral 3 squares right and 3 squares down.

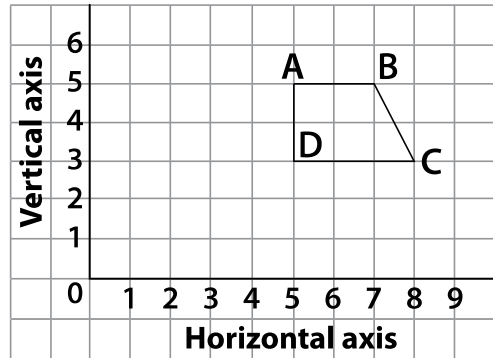   Then translate the image 1 square left and 2 squares down.

   Draw and label each image.

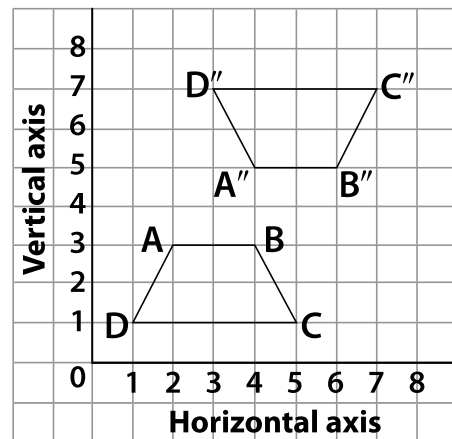2. Reflect the quadrilateral in a line through AD.

   Then reflect the image in a line though C'D.

   Then reflect the second image in a line through A"D.

Stretch Your Thinking

Describe 2 successive transformations that move Trapezoid ABCD to its image, A"B"C"D".

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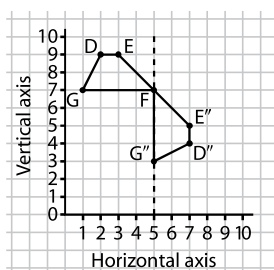**107**

Combining Transformations

Quick Review

At Home
At School

A combination of 2 or 3 different types of transformations can be applied to a shape.

To identify the transformations, we can work backward.

➤ Can you find a pair of transformations that move Trapezoid DEFG to its final image?
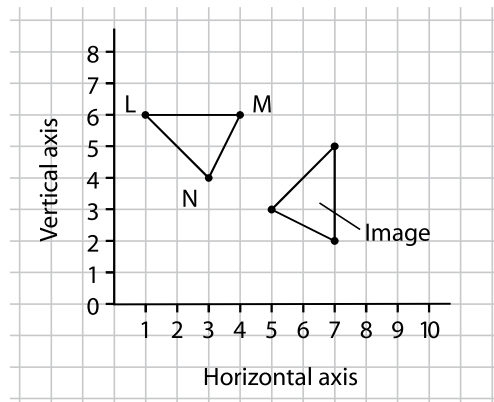
1. D'E'FG' is a reflection in a vertical line through 5 on the horizontal axis.
2. D"E"FG" is a rotation of 90° clockwise about vertex F.
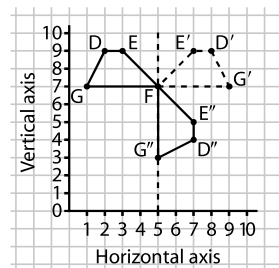
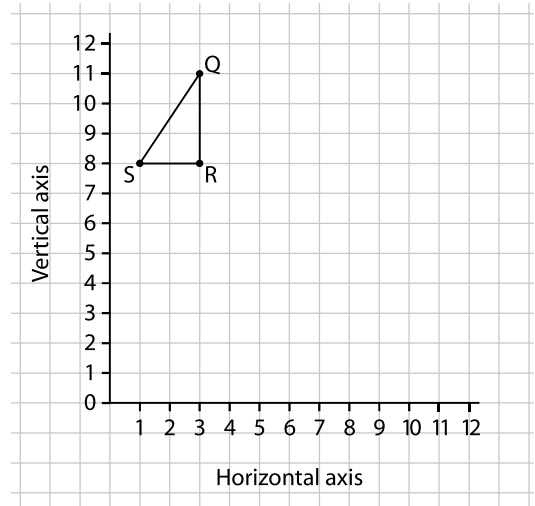## Try These

1. Describe a pair of transformations that move △LMN to its image.

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Practice

1. a) Translate △QRS 3 squares right and 2 squares down.
Then reflect the translation image in a vertical line through 7 on the horizontal axis.

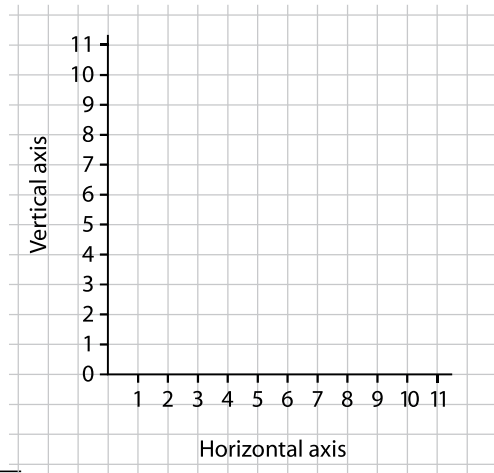**b)** List the coordinates of the final image.

_____

2. a) Draw a pentagon whose vertices have these coordinates:

A(4, 10)   B(7, 10)   C(8, 8)
D(6, 6)   E(3, 8)

b) Rotate the pentagon 180° about D.
Then translate the rotation image 2 squares left.

c) List the coordinates of the final image.

_____

Stretch Your Thinking

Apply transformations to the triangle to make a design. Explain how you did it.

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