Name: _____ **Date:** _____
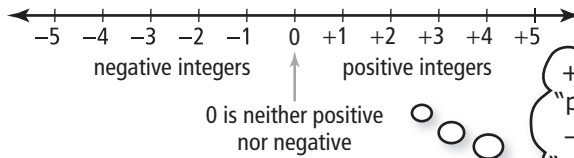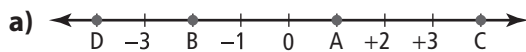
Plot Integers on a Number Line

Integers include positive numbers, negative numbers, and zero.
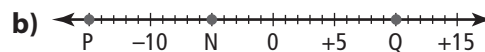Integers can be shown on a number line.

−5 −4 −3 −2 −1 0 +1 +2 +3 +4 +5

negative integers   positive integers

0 is neither positive nor negative

+1 is read as "positive one."
−1 is read as "negative one."

1. For each letter on the number lines, identify the integer.

b) P   −10   N   0   +5   Q   +15

____   ____   ____

a) D −3 B −1 0 A +2 +3 C

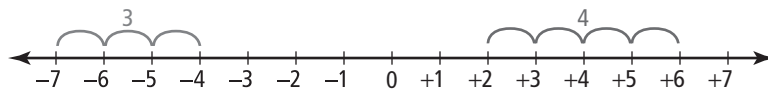____   ____   ____   ____

Find the Distance Between Points on a Number Line

The distance between two points on a number line can be determined by counting.

3

4

−7 −6 −5 −4 −3 −2 −1 0 +1 +2 +3 +4 +5 +6 +7

2. What is the distance between the two numbers placed on a number line?

a) 4 and 10 _____

b) −2 and −8 _____

c) −12 and −3 _____

d) +7 and −3 _____

e) −12 and 12 _____

3. Draw an integer number line.

a) Mark the point that is four less than zero. Label it A.

b) Mark the point that is three more than zero. Label it B.

c) Mark the point that is 7 more than −2. Label it C.
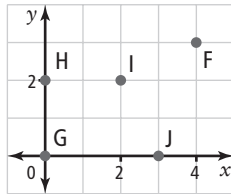
Plot Points on a Coordinate Grid

The points A(1, 3), B(5, 2), C(6, 4), D(4, 0), and E(0, 1) can be plotted on a coordinate grid.

Each point is named with an **ordered pair**.

A(1, 3)

x-coordinate   **y-coordinate**

y
4   C(6, 4)
A(1, 3)
B(5, 2)
2
E(0, 1)   D(4, 0)
0   2   4   6   8   x
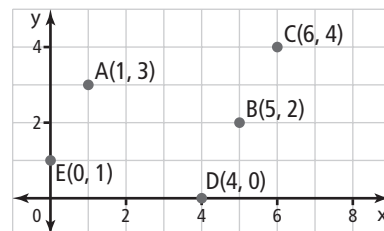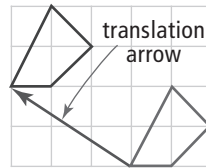
4. State an ordered pair for each point on the coordinate grid.
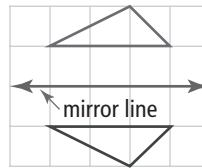

F _____

G _____

H _____

I _____

J _____

Identify Transformations

A transformation moves one geometric figure onto another.
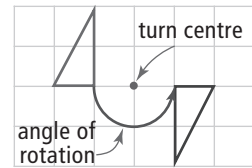Three types of transformations are translation, reflection, and rotation.
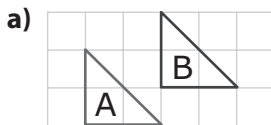
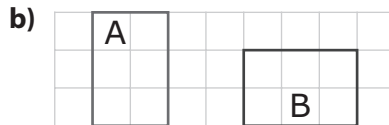**A translation is a slide.**

A reflection is a mirror image.

A rotation is a turn.

5. What is a transformation that moves Figure A onto Figure B?

a)

_____

b)

_____

c)
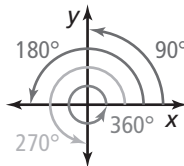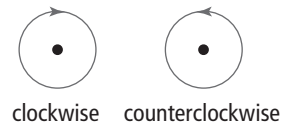

_____
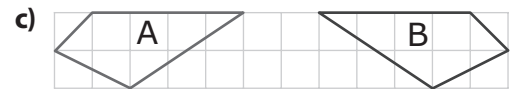
Identify Angles of Rotation

A figure can be turned or rotated any number of degrees.

The rotation can be clockwise or counterclockwise.
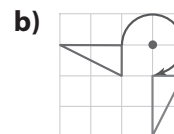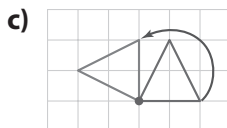

clockwise   counterclockwise

6. What is the angle of rotation for each of the following rotations? Is the rotation clockwise or counterclockwise?
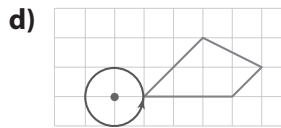
a)

_____

b)

_____

c)

_____

d)

_____
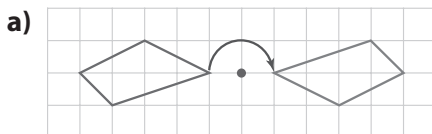
1.1 The Cartesian Plane

MathLinks 7, **pages 4–11**

Key Ideas Review

Choose from the following terms to complete #1 and #2.

| I II III IV Cartesian origin plane quadrant *x*-axis *y*-axis |

1. Complete each statement.

a) An ordered pair (x, y) is used to locate any point on a

_____ plane.

b) All points located within the same _____ have the
same signs for their *x*-coordinates and the same signs for their
y-coordinates.

2. Fill in the blanks on the diagram.

Quadrant _____   Quadrant _____

Quadrant _____   Quadrant _____
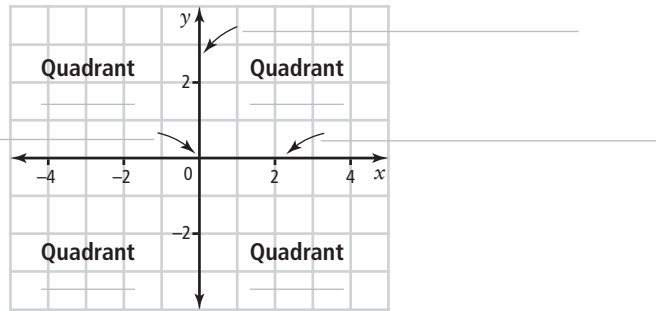
Practise and Apply

3. What are the coordinates of each
point shown on the coordinate grid?
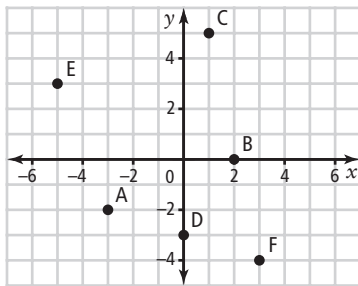
A _____   B _____

C _____   D _____

E _____   F _____

4. Identify the letter on the coordinate
grid that matches each ordered pair.

a) $(0, 5)$ _____ **b)** $(-2, -1)$ _____

c) $(4, -4)$ _____ **d)** $(-4, 4)$ _____

e) $(-3, 0)$ _____ **f)** $(4, 3)$ _____

5. a) Plot each ordered pair on the coordinate grid: A(−2, −3), B(−2, 4), C(1, 2), D(4, 4), E(4, −3).
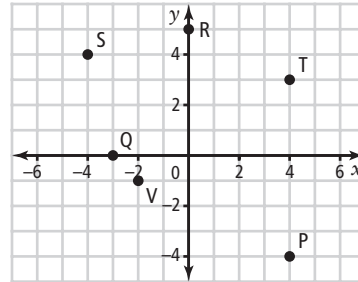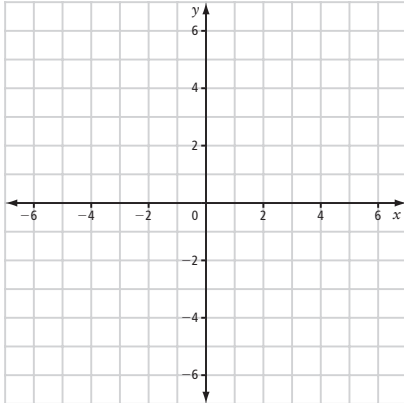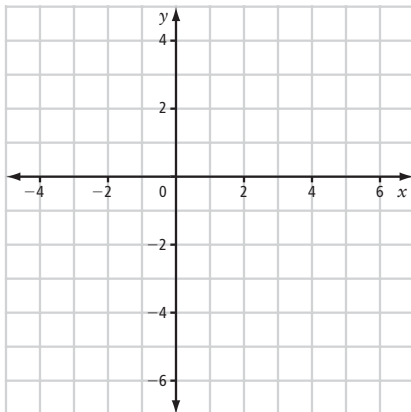

b) Connect A to B, B to C, C to D, and D to E. What shape did you create?

6. a) Create a square by plotting and connecting points P(5, 1), Q(5, −5), R(−1, −5), and S(−1, 1).

b) What is the area of the square? Show how you know.

c) What is the perimeter of the square? Show how you know.

7. a) Create a rectangle by plotting two points in quadrant I and two points in quadrant IV, and connecting the points.
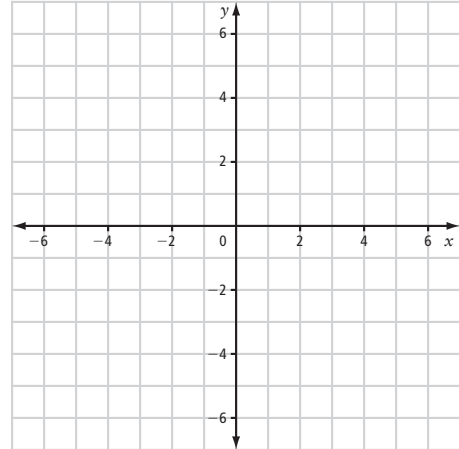
b) Write the coordinates of each vertex on the grid.

c) What is the length of each side of the rectangle?

8. a) Create an isosceles right triangle that has each vertex in a different quadrant.
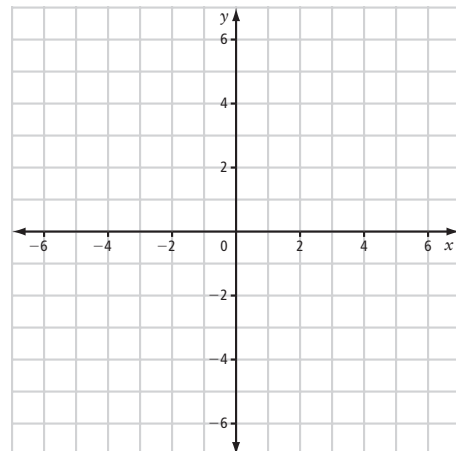
b) Write the coordinates of each vertex on the grid.

c) Show how you know the triangle is isosceles.

1.2 Create Designs

MathLinks 7, **pages 12–17**

Key Ideas Review

1. What steps should you take to draw a design on a coordinate grid? Write the step number from column B that matches each description in column A.

| A	B
a) Connect the vertices to make the design. _____	Step 1
b) Plot the vertices of the design. _____	Step 2
c) Colour the design, if it has colour. _____	Step 3
d) Identify the vertices and name their coordinates. _____	Step 4

2. A figure has the following coordinates: R(2, 4), S(−5, 4), T(−5, −1), U(2, −1).

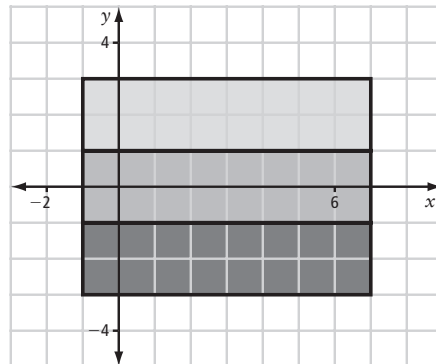   **a)** Label the *x*-axis from at least _____ to _____.

   b) Label the *y*-axis from at least _____ to _____.

Practise and Apply

3. Write the coordinates of the vertices of figures E, F, G, and H on the grid.
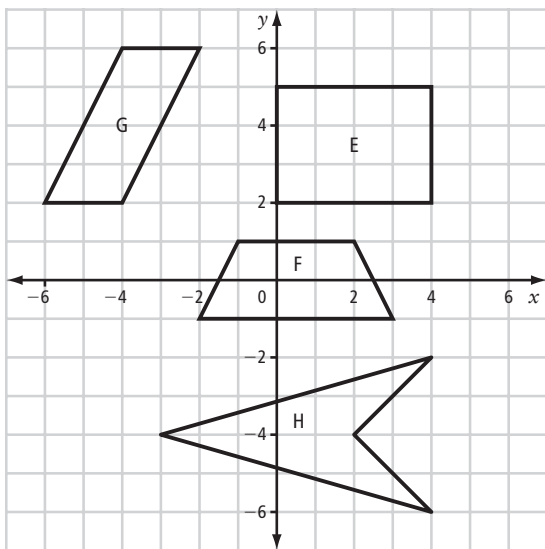
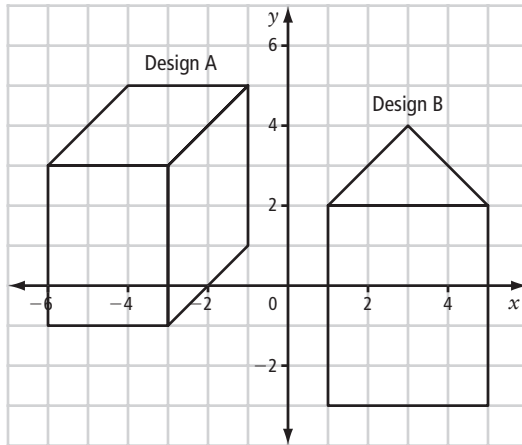4. **a)** For the following design, write the coordinates of the vertices on the grid.

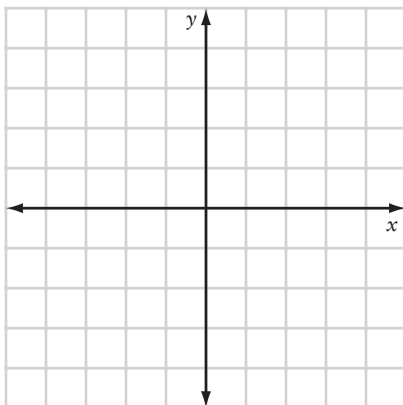   **b)** Describe the steps you would follow to copy the design.

Name: _____

5. a) For each of the following designs, write the coordinates of the vertices on the grid.

Design A

Design B

b) What steps would you follow to copy each design?

6. a) Label the coordinate grid from −4 to 4. Draw a design by plotting the following points:
A(0, 0), B(−1, −2), C(−2, −2), D(−1, 0), E(−2, 1), F(−2, 2), G(0, 1), H(1, 2), I(2, 2), J(1, 0), K(2, −1), L(2, −2), M(0, −1).

b) Connect the dots in this order: A, B, C, D, A, E, F, G, A, H, I, J, A, K, L, M, A.

Describe the design.

7. a) Draw a coordinate grid of quadrant I only.

b) Label the axes by 2s from 0 to 10.

c) Plot the following points on the grid: R(2, 9), S(7, 9), T(7, 1), V(2, 1).

d) Connect R to S, S to T, T to V, and V to R.

e) What figure have you drawn?

f) List the length and width of the figure as an ordered pair (*l*, *w*).

1.3 Transformations

MathLinks 7, pages 18–29

Key Ideas Review

Choose from the following terms to complete #1.

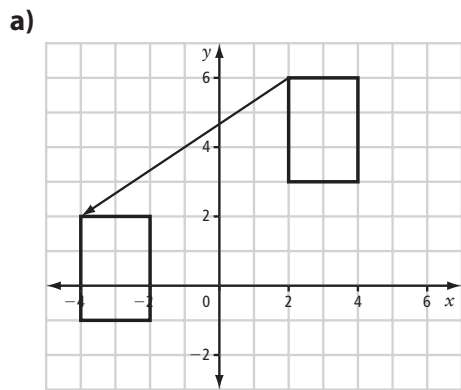| centre of rotation | point | transformation | translation | reflection | rotation |

1. Complete each statement.

　a) Another word for slide is _____.

　b) A _____ can be clockwise or counterclockwise.

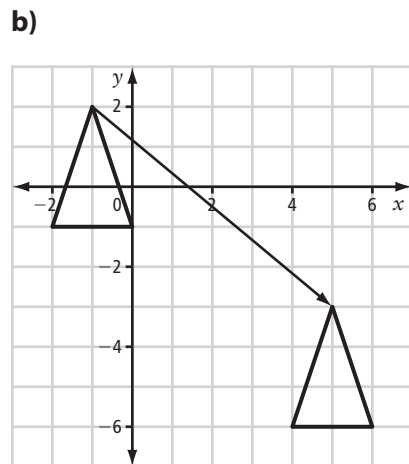　**c)** A _____ is a mirror image.

2. Identify each transformation.

a) _____

b) _____

c) _____

Practise and Apply

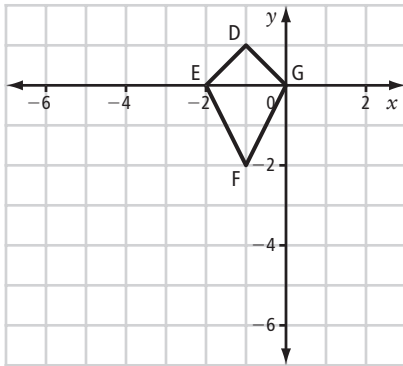**3.** What is the translation shown in each diagram?
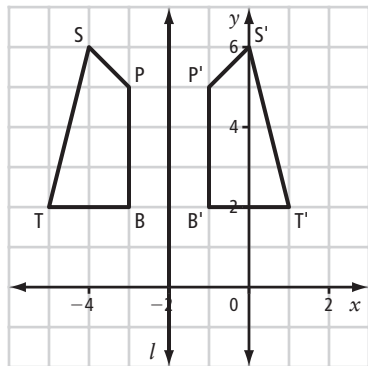
a)

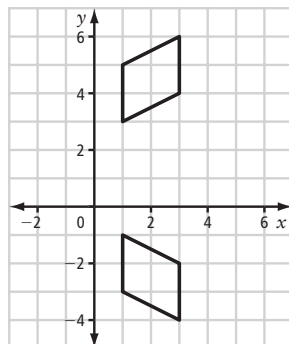Translation: _____

b)

Translation: _____

4. a) Translate figure DEFG 3 units left and 4 units down.

b) Draw the translation arrow.

c) Write the coordinates of the translation image on the grid.

5. a) Is figure S′P′B′T′ a reflection image of figure SPBT in the line of reflection *l*? _____ Yes _____ No

b) How do you know?

6. Draw the line of reflection for the parallelogram.

7. The diagram shows figure MSAE, its rotation image, and centre of rotation R.
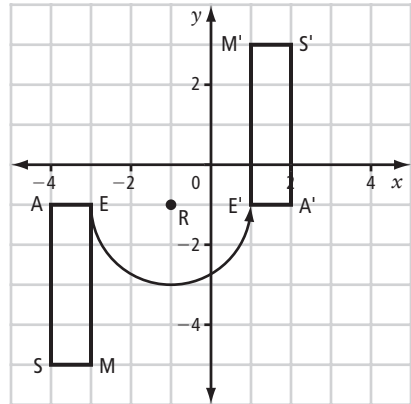
a) Label the coordinates of MSAE and M′S′A′E′ on the grid.

b) What are the direction and angle of rotation?

8. The diagram shows a triangle and its rotation image.
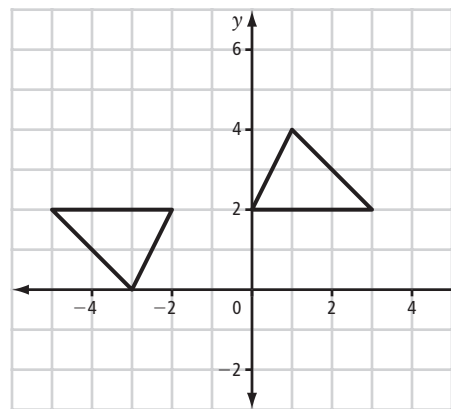
a) Label the coordinates of the centre of rotation on the grid.

b) What are the direction and angle of rotation? Give more than one answer, if possible.

1.4 Horizontal and Vertical Distances

MathLinks 7, pages 30–35

Key Ideas Review

1. Use the grid to complete each statement.

a) Movement from A′ to A″ is called

_____ movement.

b) Movement from B to B′ is called

_____ movement.

c) After one transformation, D

becomes _____ .

d) After two transformations, D

becomes _____ .
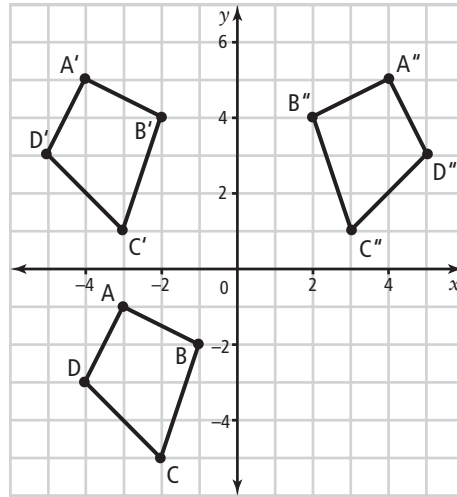
Practise and Apply

2. Describe the horizontal and vertical movements of point T to each of the following points.

a) D _____

b) E _____

c) F _____

d) G _____
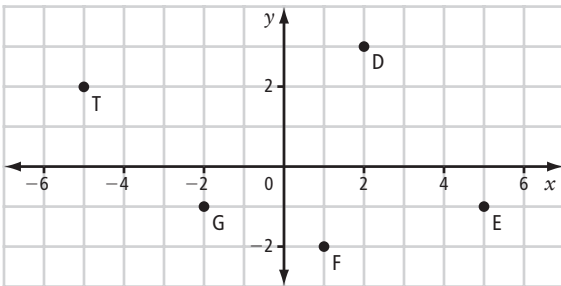
3. Parallelogram SUVT has been translated.

a) Label the coordinates of S′U′V′T′ on the grid.

b) What are the horizontal and vertical movements of SUVT to S′U′V′T′?

4. a) Draw a triangle with vertices
C(−1, 1), D(−2, 4), and E(−4, 1).
Reflect CDE over the *y*-axis.
Reflect C′D′E′ over the *x*-axis.

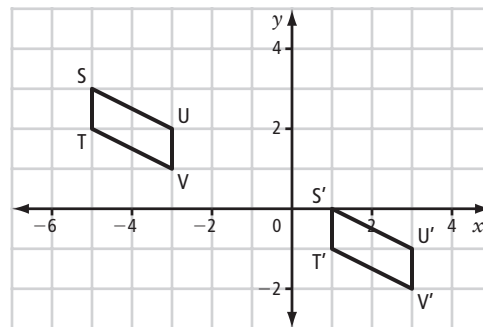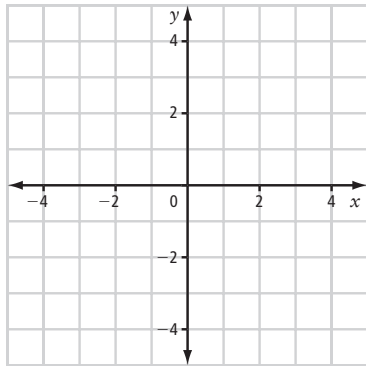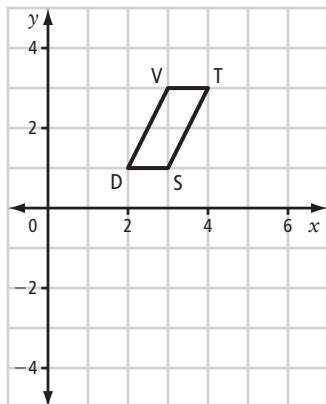**b)** Describe the horizontal and vertical
change in position of C to C′ to C″.

c) Describe the movement of the
vertices in the reflection over
the *x*-axis.

d) Label the coordinates of triangle
C″D″E″ on the grid.

e) Compare the coordinates of C
with C″. What do you notice?

5.

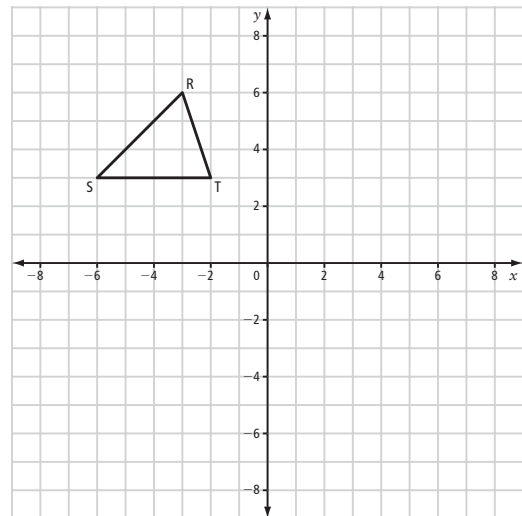**a)** Translate vertex D 1 unit left and
3 units down. Label this vertex D′.

b) Translate vertex V 6 units down.
Label this vertex V′.

c) Translate vertex T 1 unit left and
7 units down. Label this vertex T′.

d) Translate vertex S 2 units left and
4 units down.

e) Connect D′ to V′, V′ to T′,
T′ to S′, and S′ to D′.

f) What one transformation of the
parallelogram DVTS would have
given the same result?

6.

a) Translate the triangle 1 unit
horizontally left, and 4 units
vertically down.

b) Label the vertices of the
translated triangle on the grid.

c) Reflect RST over the y-axis and
label the triangle R″S″T″.

d) Label the vertices of the reflected
triangle on the grid.

e) Rotate RST 180° about the centre
of rotation (0, 0) and label this
triangle R‴S‴T‴.

f) Label the vertices of the rotated
triangle on the grid.

Link It Together

1. a) Plot triangle PQR with vertices P(-5, -1), Q(-3, 2), and R(-1, 0) on the coordinate grid.

   b) Translate the triangle 3 units horizontally right and 4 units vertically down. Label the new triangle P'Q'R'.

   c) Reflect triangle P'Q'R' in the *x*-axis to form triangle P"Q"R".

   d) Label the coordinates of the vertices of triangle P"Q"R" on the grid.

   e) What are the horizontal and vertical movements from P to P", Q to Q", and R to R"?
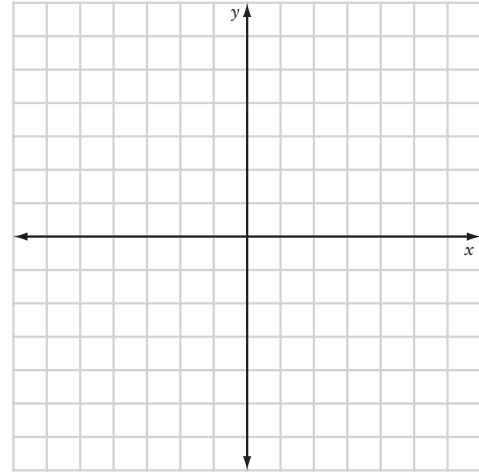
2. a) In quadrant I, design the shape of the first initial of your name.

   b) Label the coordinates of the vertices on the grid.

   c) Describe a reflection that would move your initial to quadrant II. Draw the reflection image.
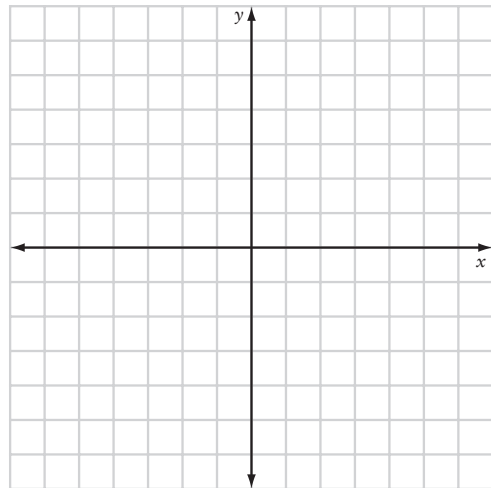
   d) Describe a rotation that would move your initial to quadrant III. Draw the rotation image.

   e) Describe a translation that would move your initial to quadrant IV. Draw the translation image.

Vocabulary Link

Unscramble the letters of each word. Use the clues to help you solve the puzzles.

A	B
1. The four regions of a coordinate grid are referred to as _____.	SRTUDQANA
2. This transformation involves a slide along a straight line: _____.	STOTNAALRIN
3. The vertical line on a coordinate grid is called a(n) _____.	SX-IAY
4. The _____ for the origin are (0, 0).	ROAENSDTCOI
5. The horizontal line on a coordinate grid is called a(n) _____.	-IXAXS
6. A(n) _____ _____ is formed when a horizontal number line and a vertical number line cross.	TEACRNSIA NPLEA
7. This transformation involves a flip over a mirror line: _____.	FETINEOLRC
8. The *x*-axis and *y*-axis cross at the _____.	IRINGO
9. Translations, reflections, and rotations are all types of _____.	FITOROSNSAAMTNR
10. A(n) _____ is a turn around a fixed point.	AIORONTT
11. A(n) _____ is the point where two sides of a figure meet.	EEXVTR