Position & Direction

Master The Curriculum

4

Fluency & Reasoning Teaching Slides

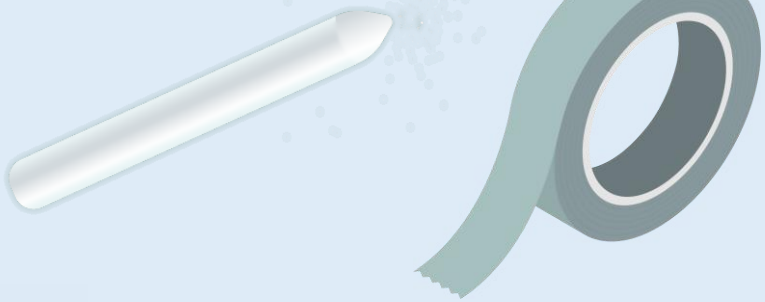
Describe Position

4

Fluency & Reasoning Teaching Slides

Activity 1 Describe Position

Create a large grid using chalk or masking tape.
Give the children coordinates to stand at.
Encourage the children to move along the axes in the order they read them.



In which order do we read axes?

Activity 2 Describe Position

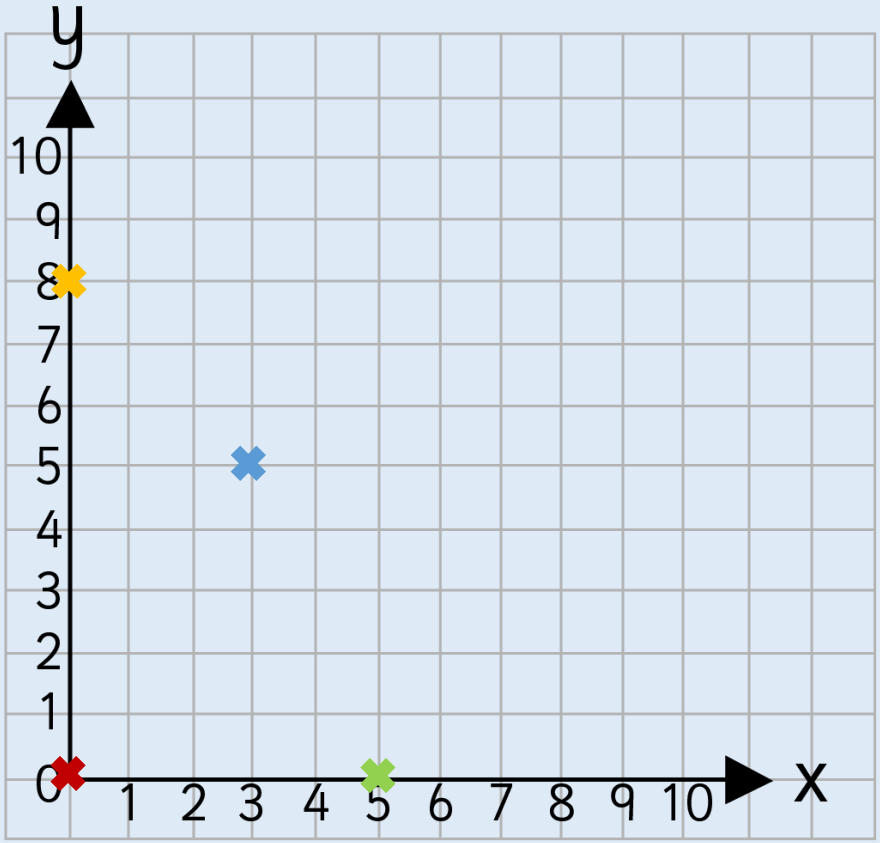
Write the coordinates for the points shown.

(____, ____)

(____, ____)

(____, ____)

(____, ____)



Does it matter in which order we read the axes?

Activity 2 Describe Position

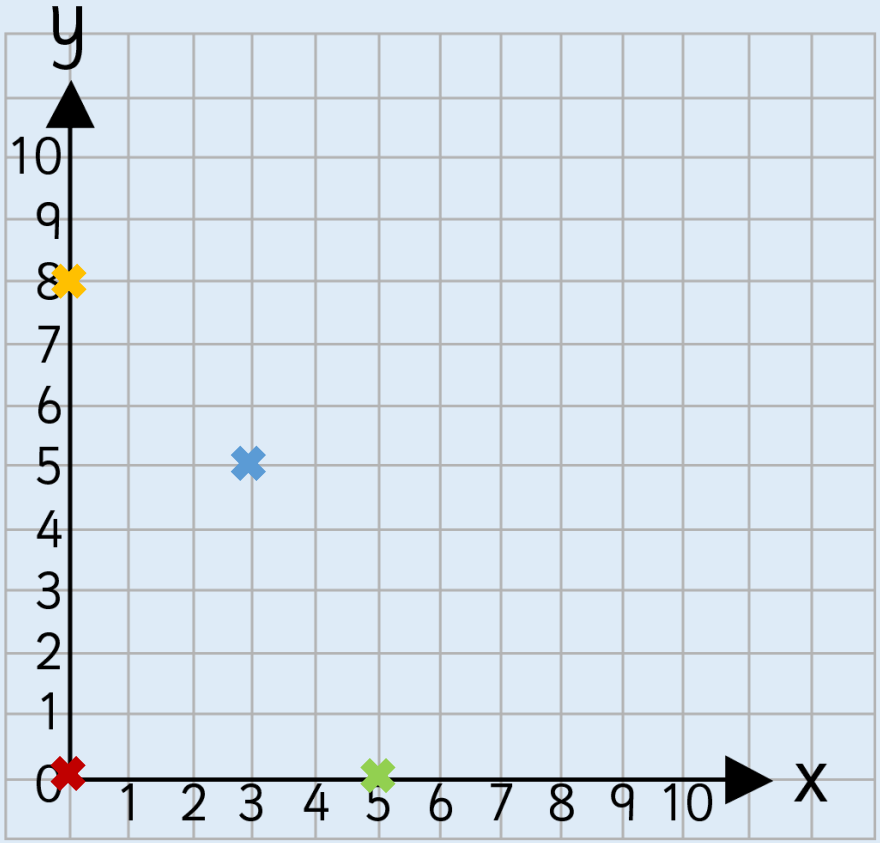
Write the coordinates for the points shown.

✖ (0 , 8)

✖ (3 , 5)

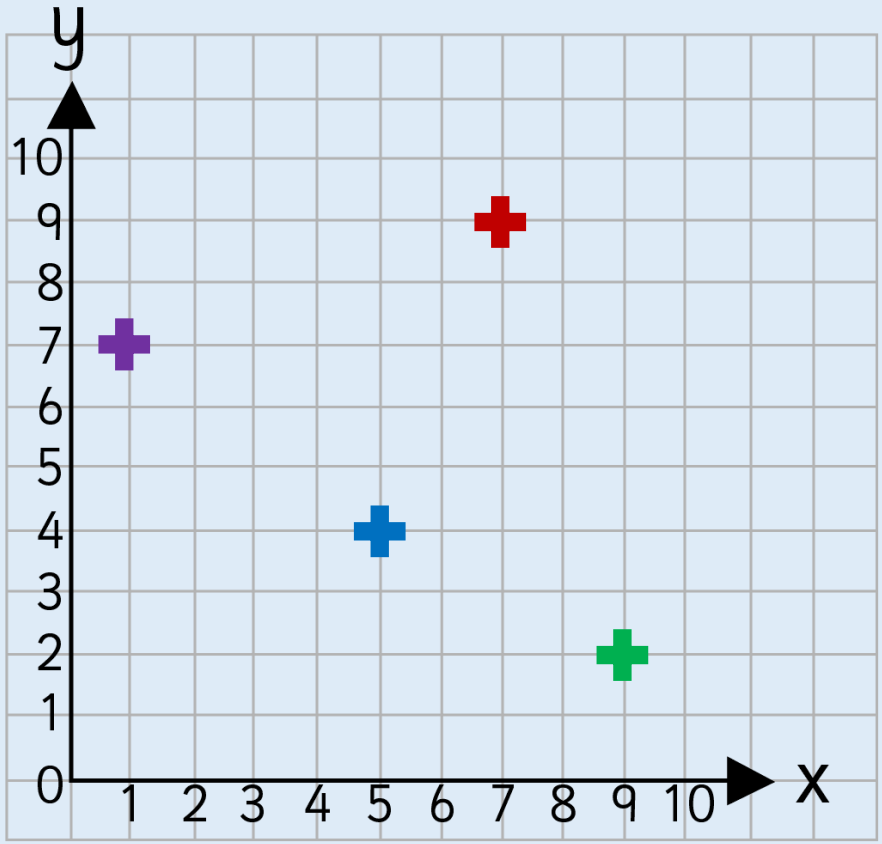
✖ (0 , 0)

✖ (5 , 0)



Activity 2 Describe Position

Write the coordinates for the points shown.



(____, ____)

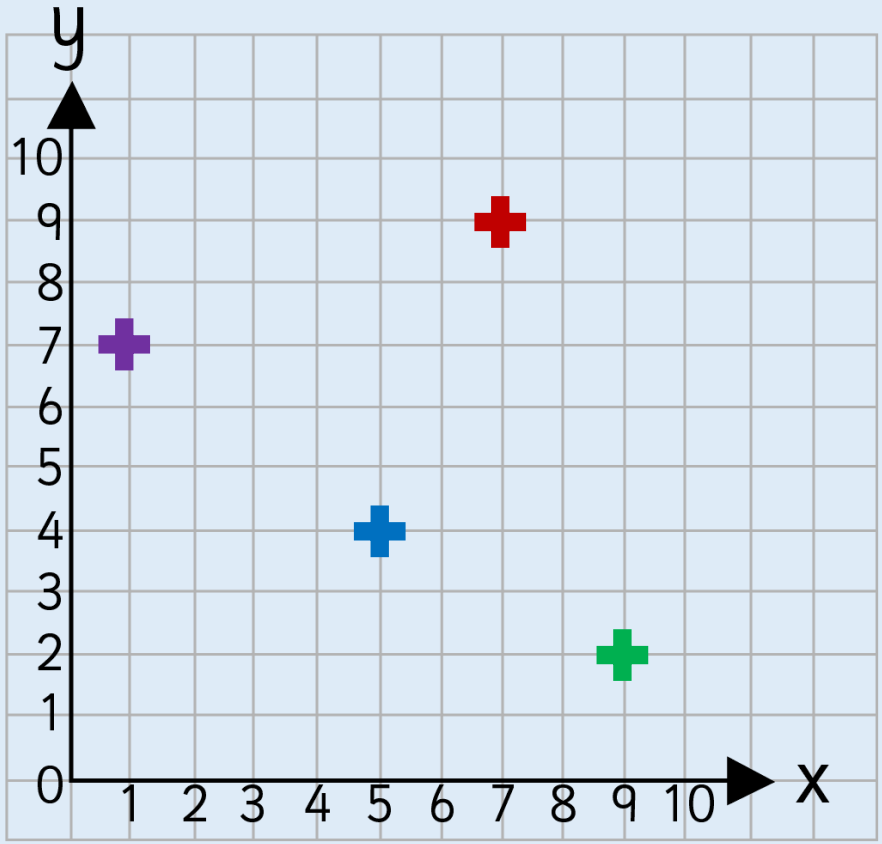
(____, ____)

(____, ____)

(____, ____)

Activity 2 Describe Position

Write the coordinates for the points shown.



(1, 7)

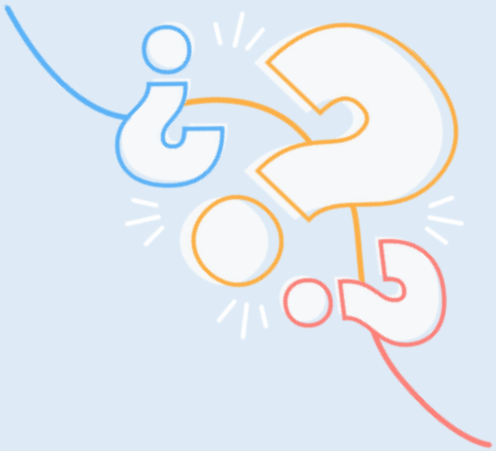
(7, 9)

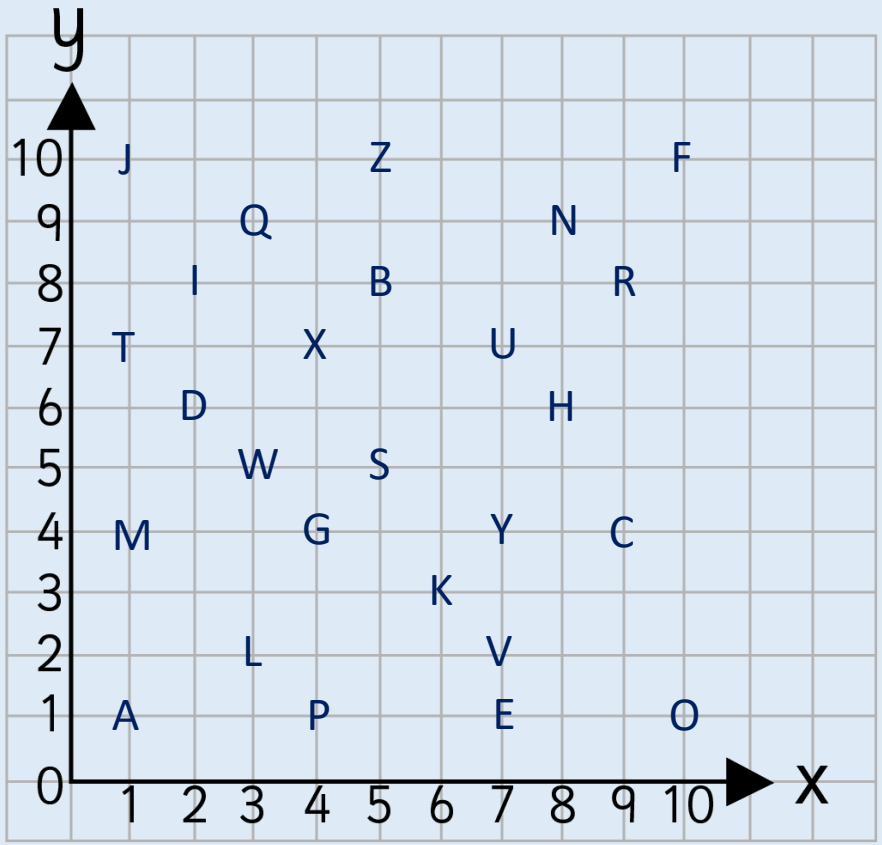
(5, 4)

(9, 2)

Activity 3 Describe Position

Write out the coordinates that spell your name.





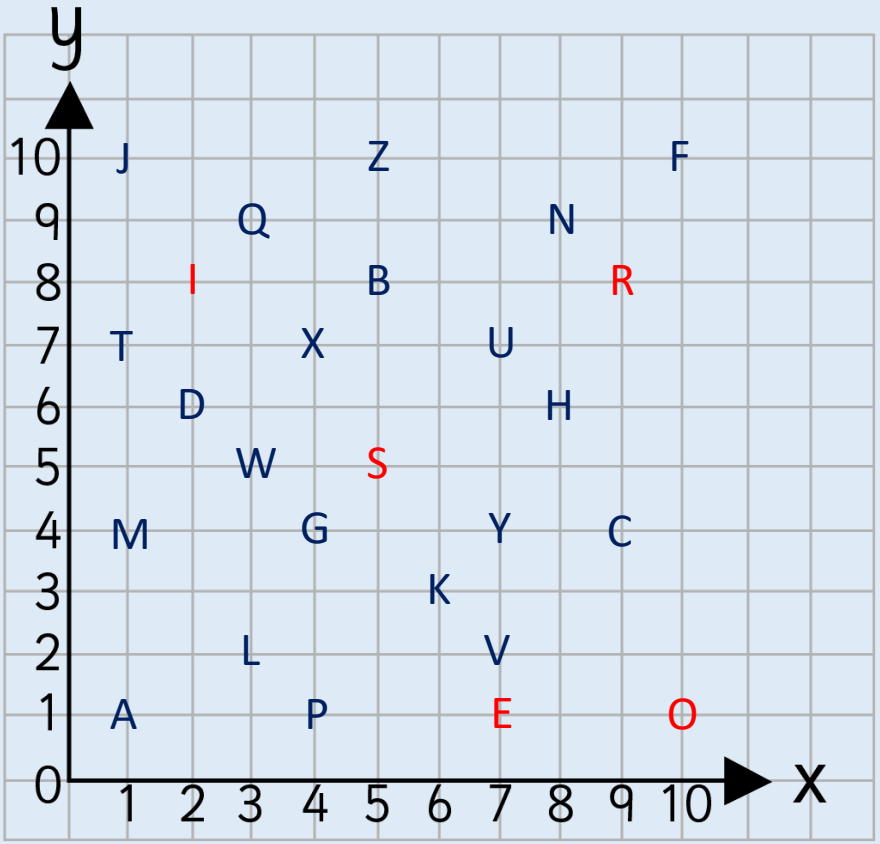
Rosie

What would the coordinates be for Rosie?

Activity 3 Describe Position

Write out the coordinates that spell your name.

R (9, 8)
O (10, 1)
S (5, 5)
I (2, 8)
E (7, 1)

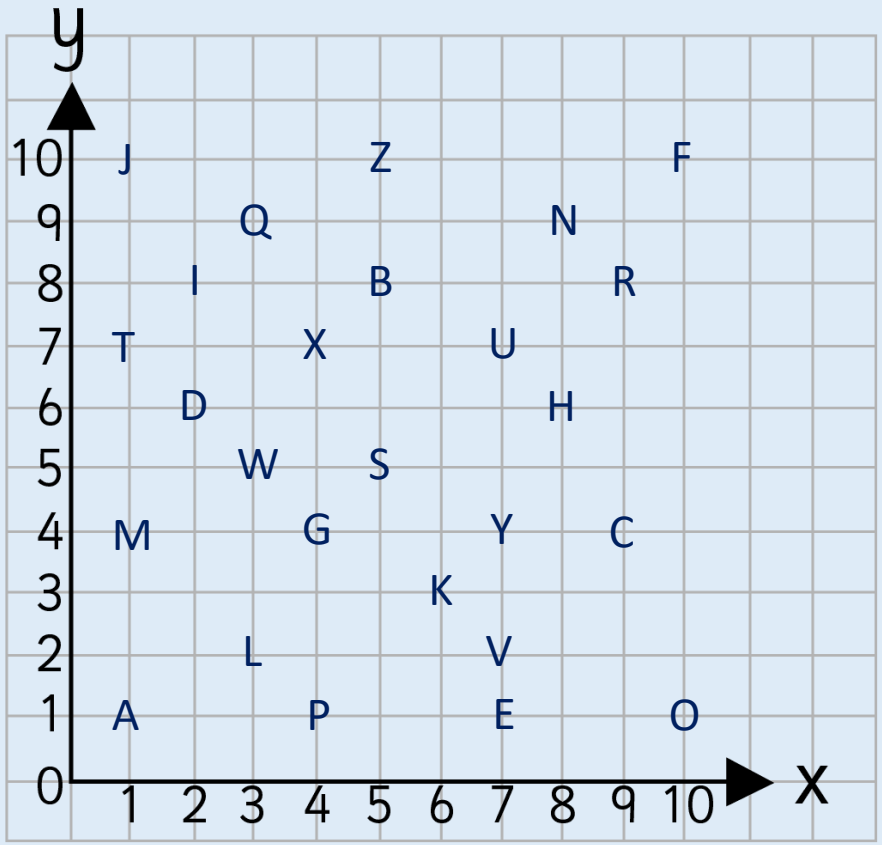


Rosie

Activity 3 Describe Position

Write out the coordinates that spell Malachi's name.

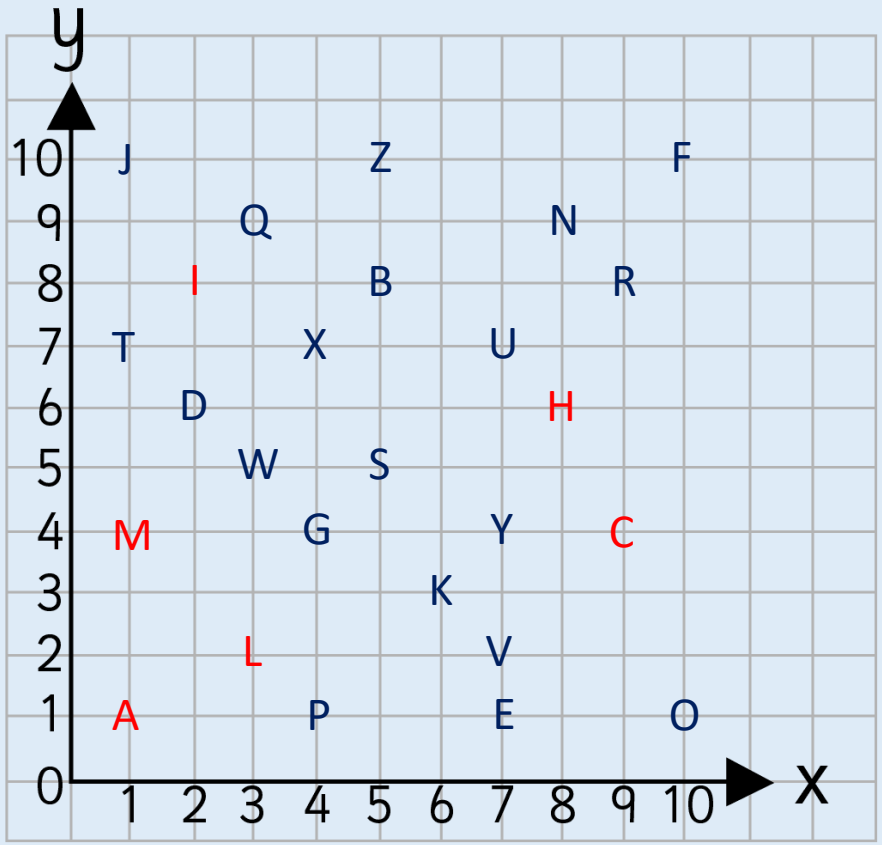
Malachi



Activity 3 Describe Position

Write out the coordinates that spell Malachi's name.

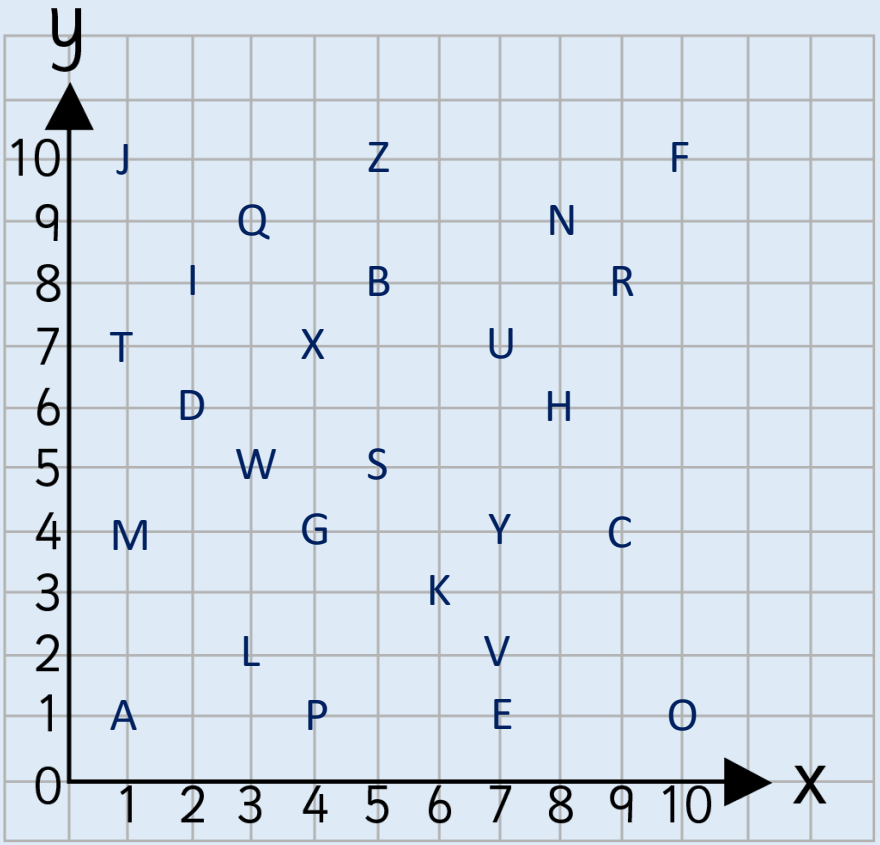
Malachi



M (1, 4)
A (1, 1)
L (3, 2)
A (1, 1)
C (9, 4)
H (8, 6)
I (2, 8)

Activity 3 Describe Position

Write out the coordinates that spell Esin's name.

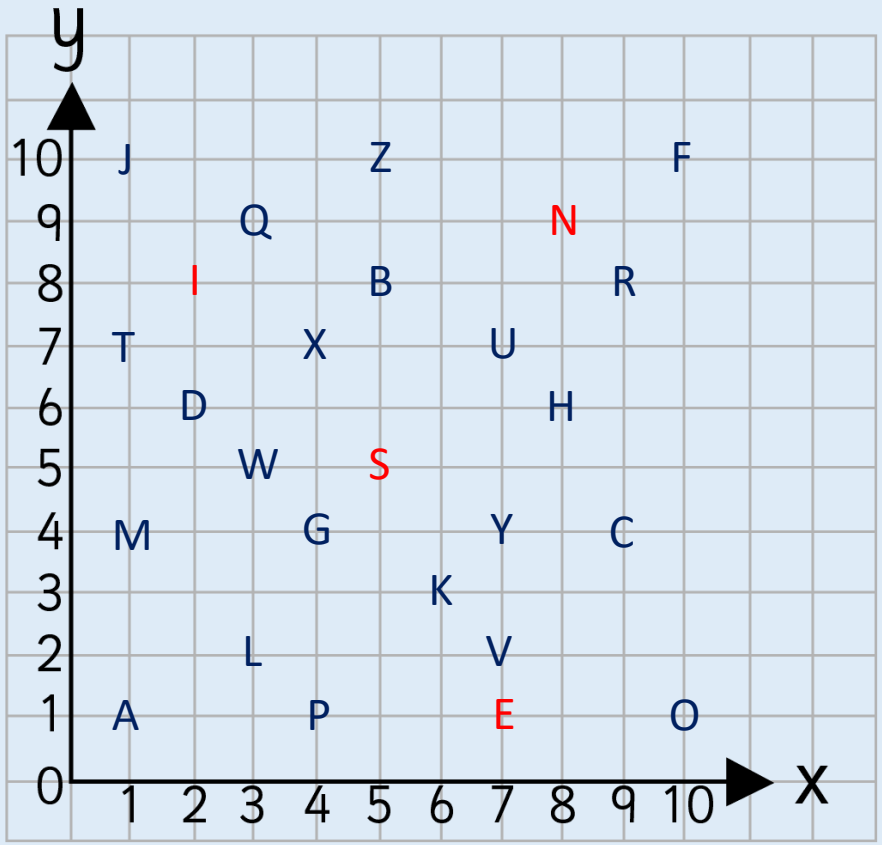


Esin

Activity 3 Describe Position

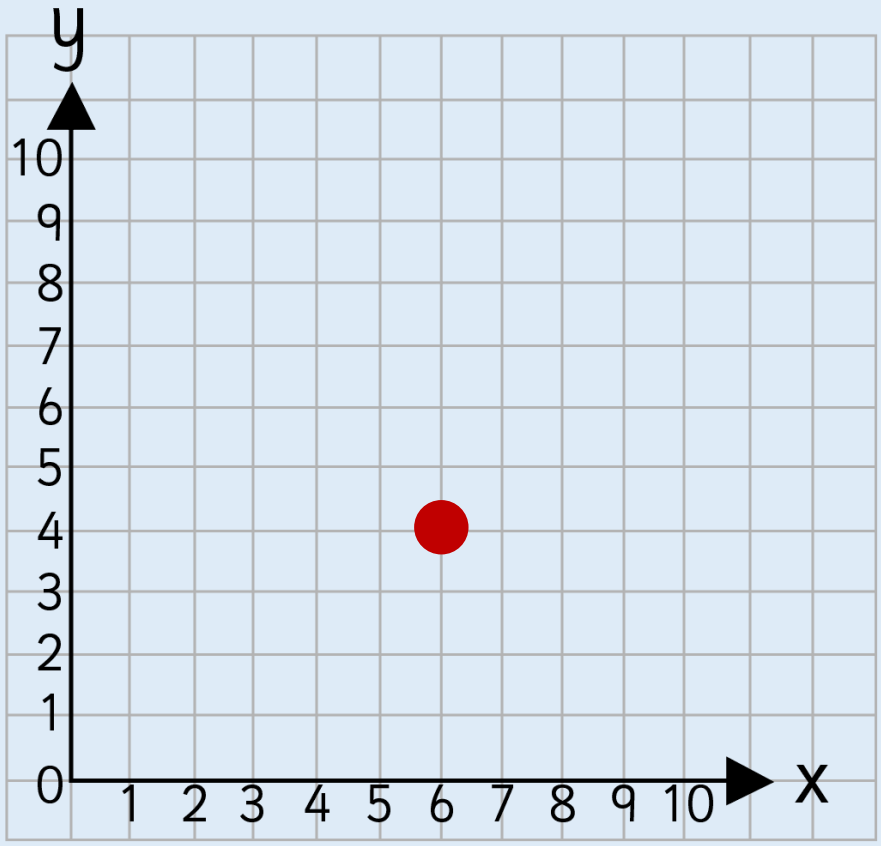
Write out the coordinates that spell Esin's name.

E (7, 1)
S (5, 5)
I (2, 8)
N (8, 9)



Esin

Reasoning 1 Describe Position



The point is plotted at (6,4)

Zach

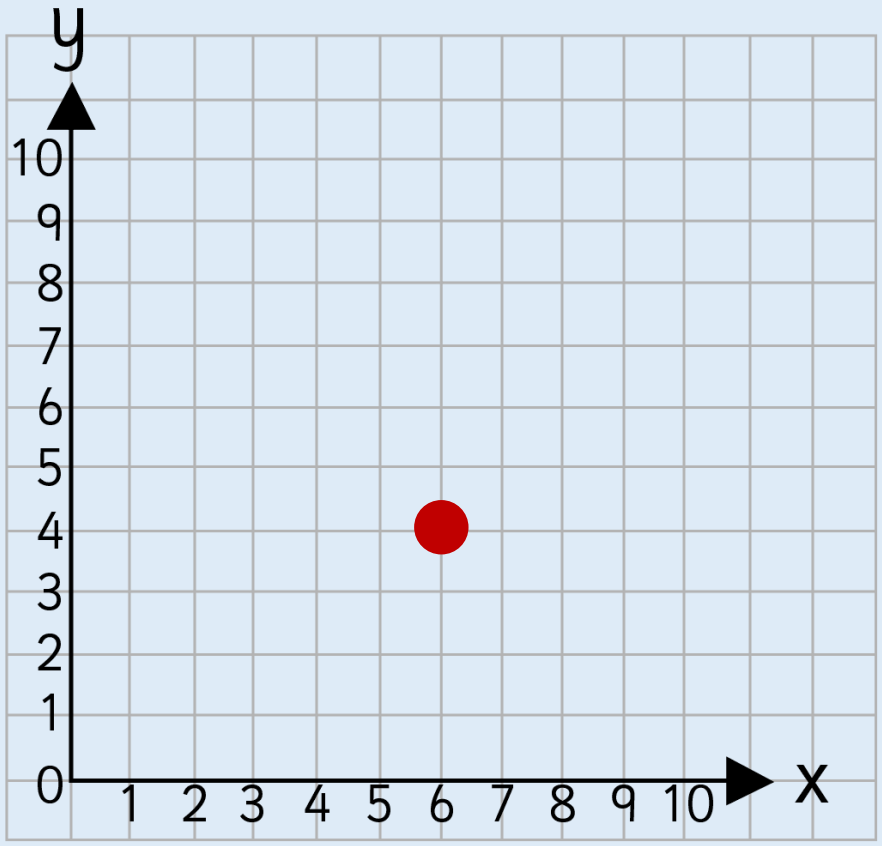
The point is plotted at (4,6)

Tia

Who is correct?
What mistake has one of the children made?

Reasoning 1

Describe Position



The point is plotted at (6,4)

Zach

The point is plotted at (4,6)

Tia

Zach is correct.

Tia has read the y-axis before the x-axis.

Reasoning 2 Describe Position

Which clue matches which coordinate?

Clue 1

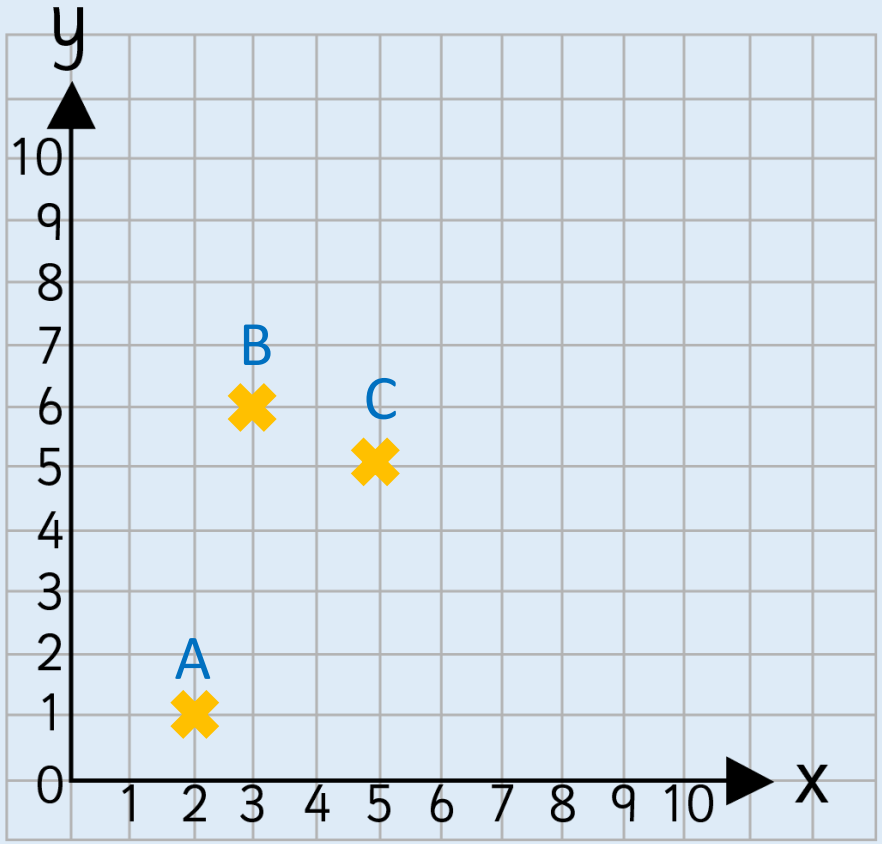
My *x* coordinate is half of my *y* coordinate.

Clue 2

My *y* coordinate is less than my *x* coordinate.

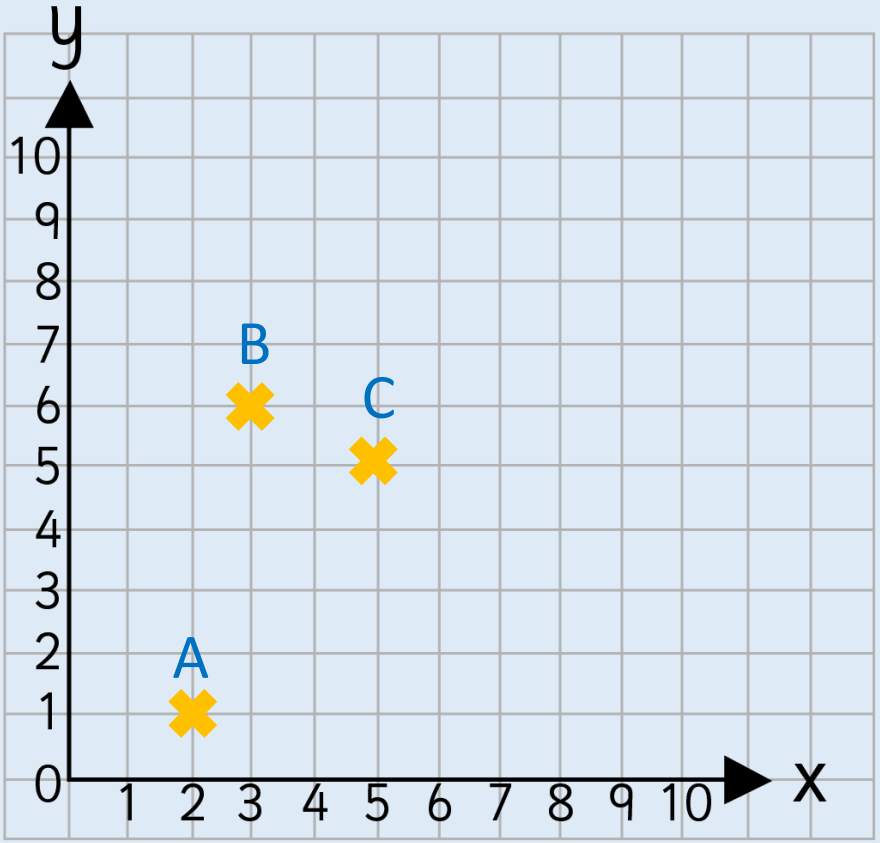
Clue 3

Both my coordinates are prime numbers.



Reasoning 2 Describe Position

Clue 1 – B
Clue 2 – A
Clue 3 – C



Discussion

Describe Position

Which is the x-axis?
Which is the y-axis?

In which order do we read the axes?
Does it matter in which order we read the axes?

How do we know where to plot the point on the grid?

What are the coordinates for ____?

Where would (___, ___) be?

Draw on a Grid

4

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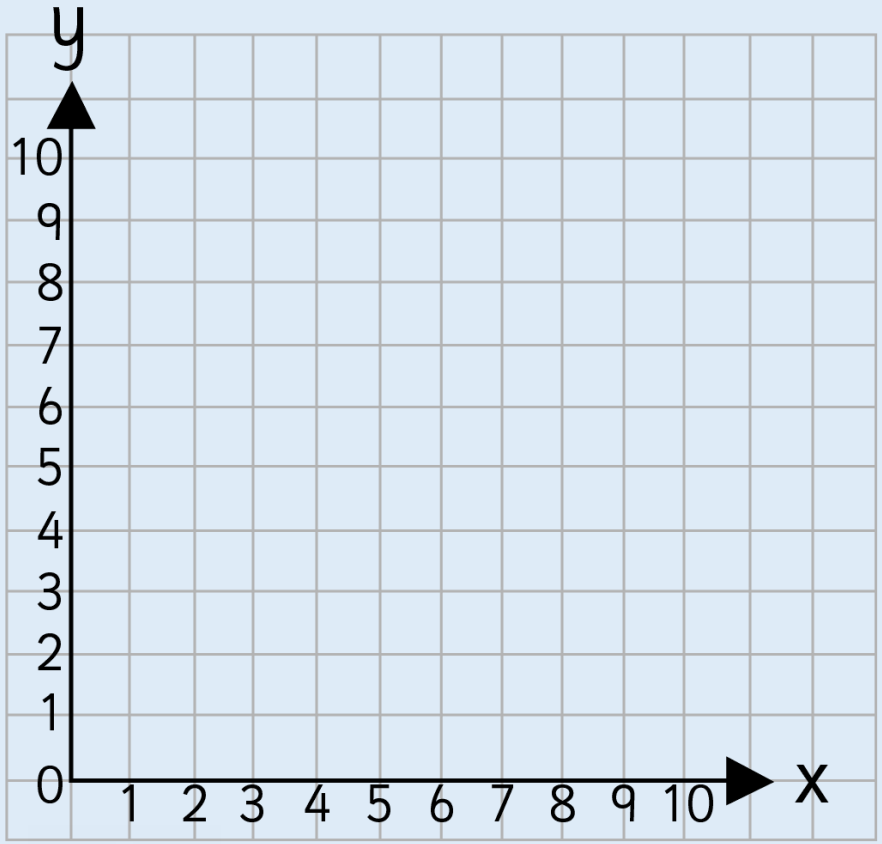
Activity 1 Draw on a Grid

Draw the shapes at the correct points on the grid.



(7, 8)

(4, 6)

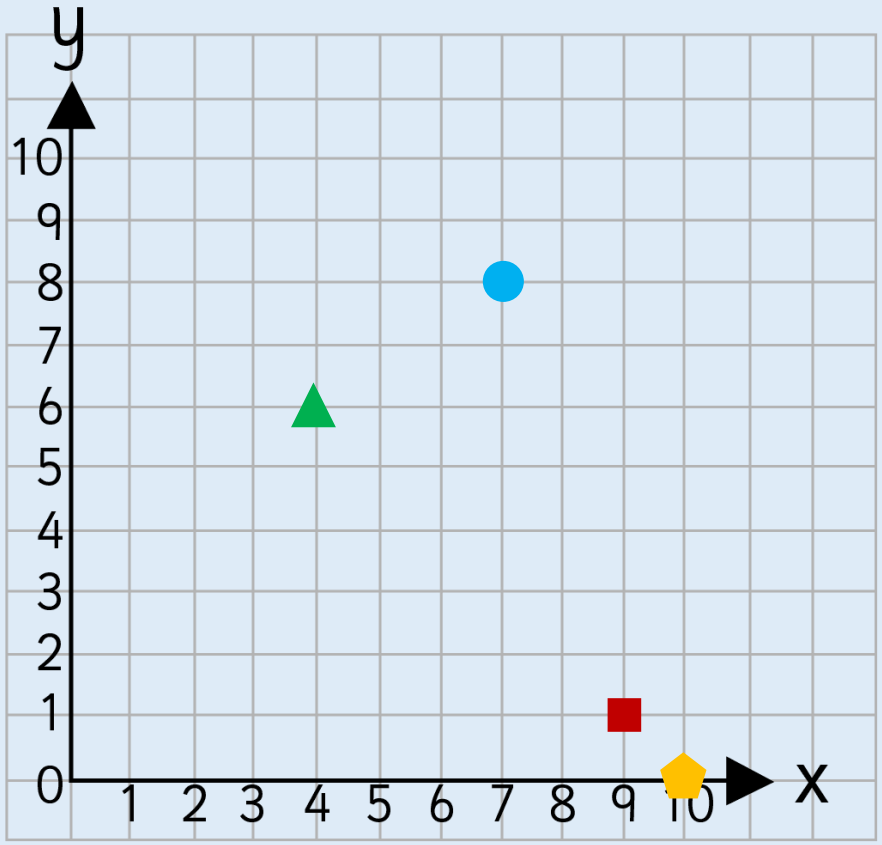
(9, 1)

(10, 0)

Do we plot our point on the line, or next to the line?

Activity 1 Draw on a Grid

Draw the shapes at the correct points on the grid.



(7, 8)

(4, 6)

(9, 1)

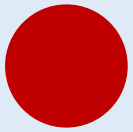
(10, 0)

Activity 1 Draw on a Grid

Draw the shapes at the correct points on the grid.

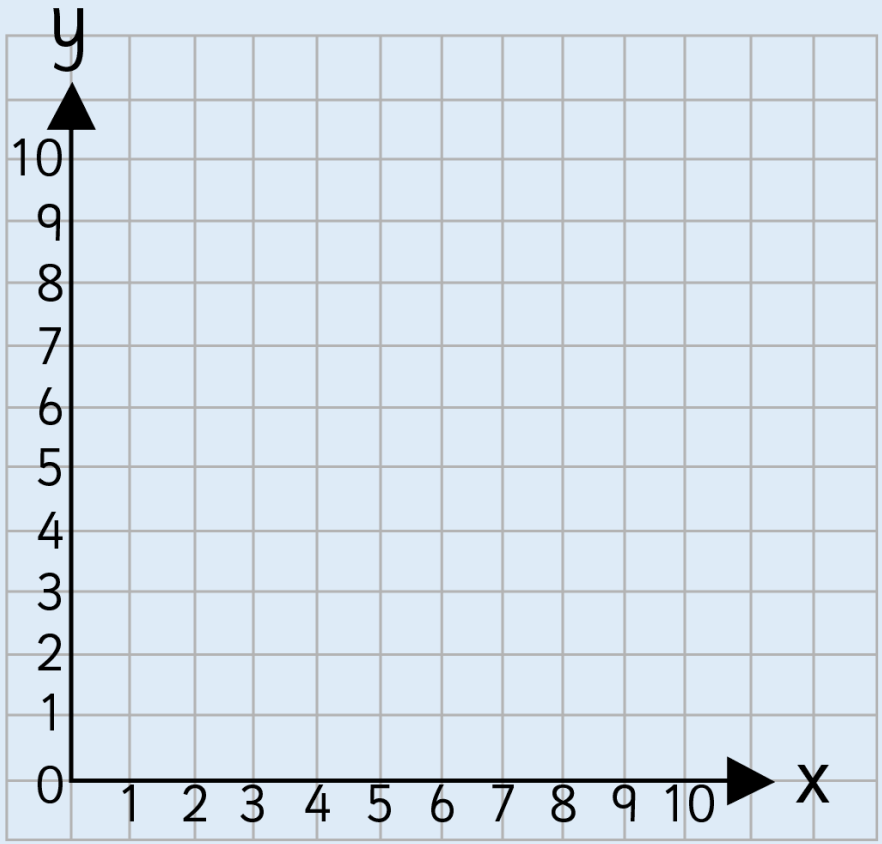
(8, 4)

(10, 10)



(3, 7)

(6, 9)



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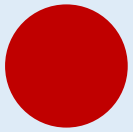
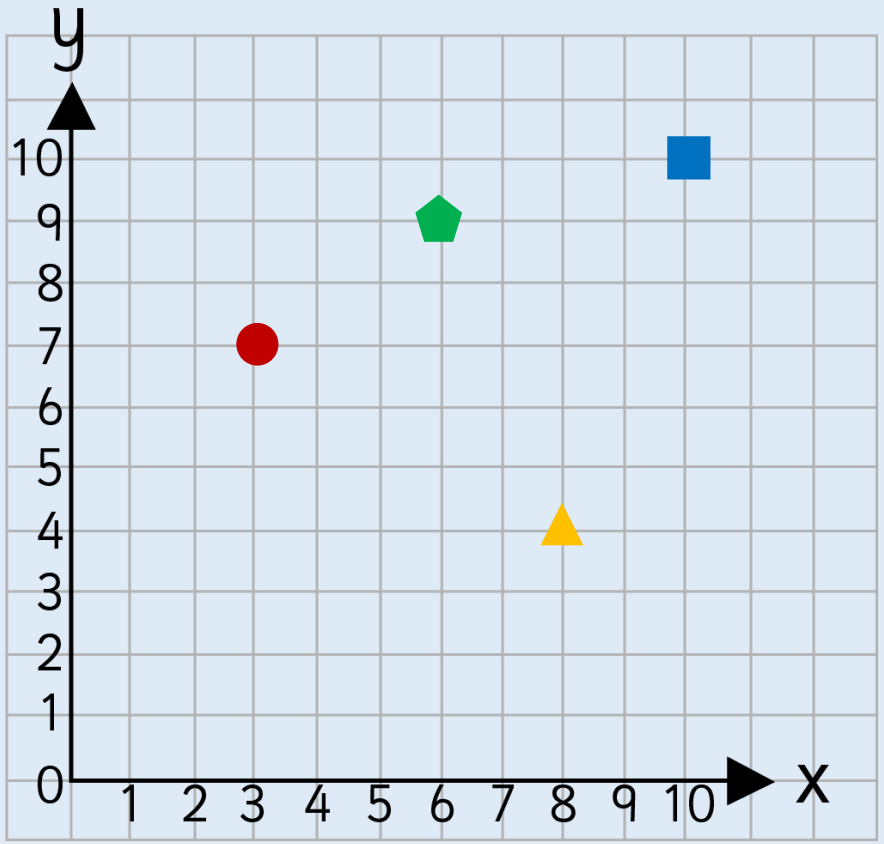
(8, 4)

(10, 10)



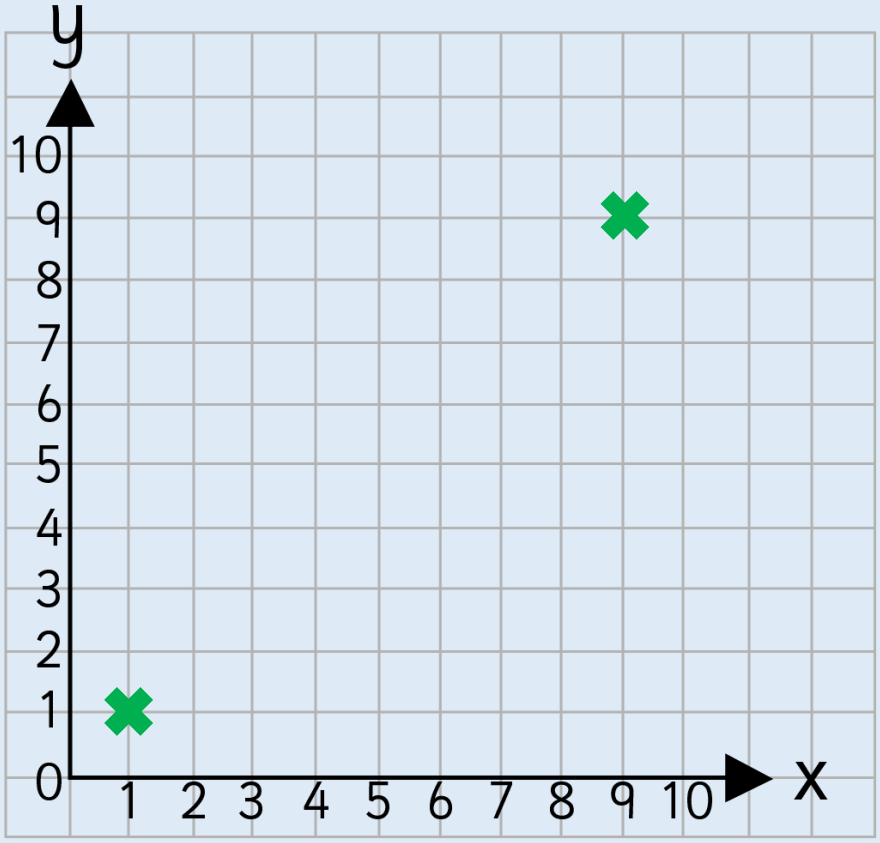
(3, 7)

(6, 9)



Activity 2 Draw on a Grid

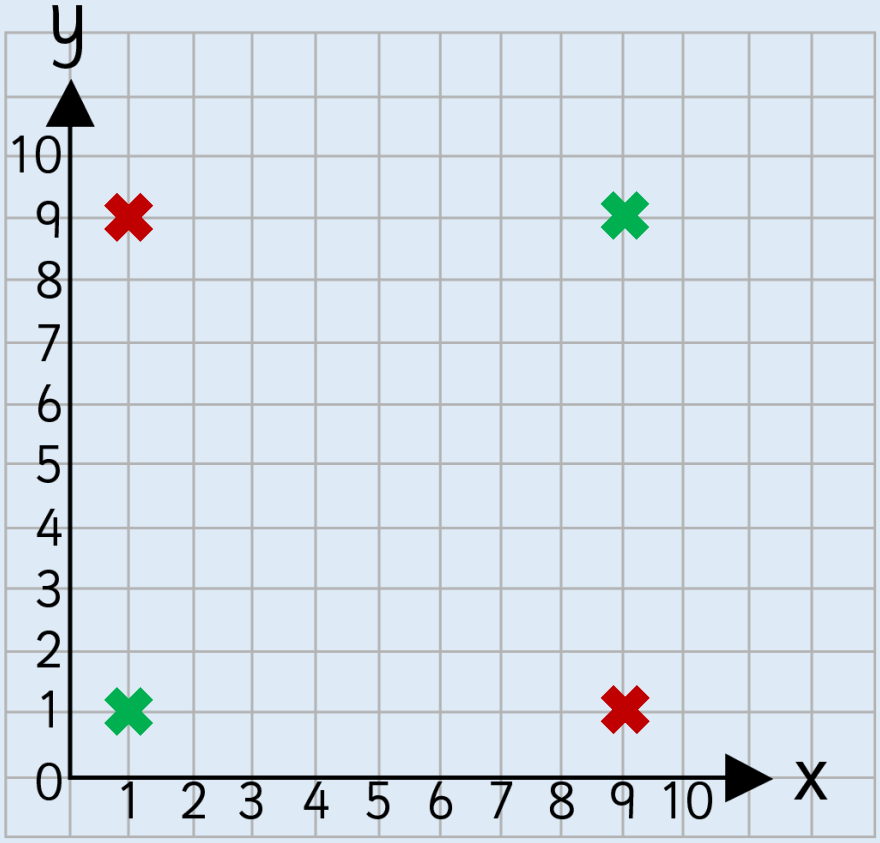
Plot two more points to create a square.



How could we use a ruler to help plot points?

Activity 2 Draw on a Grid

Plot two more points to create a square.



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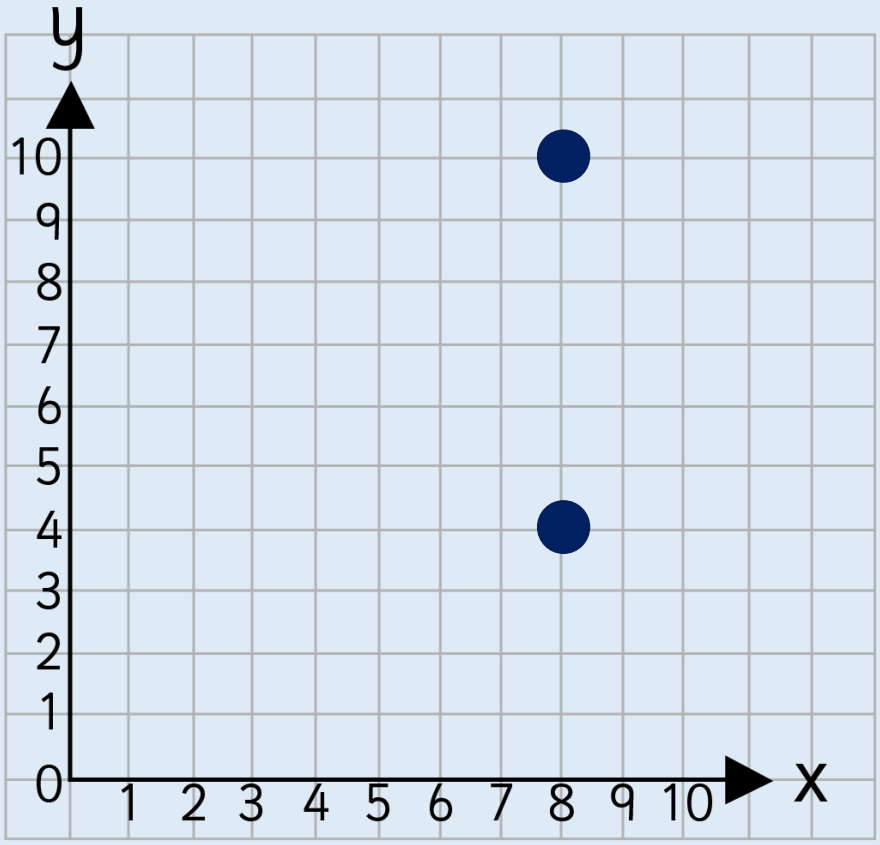

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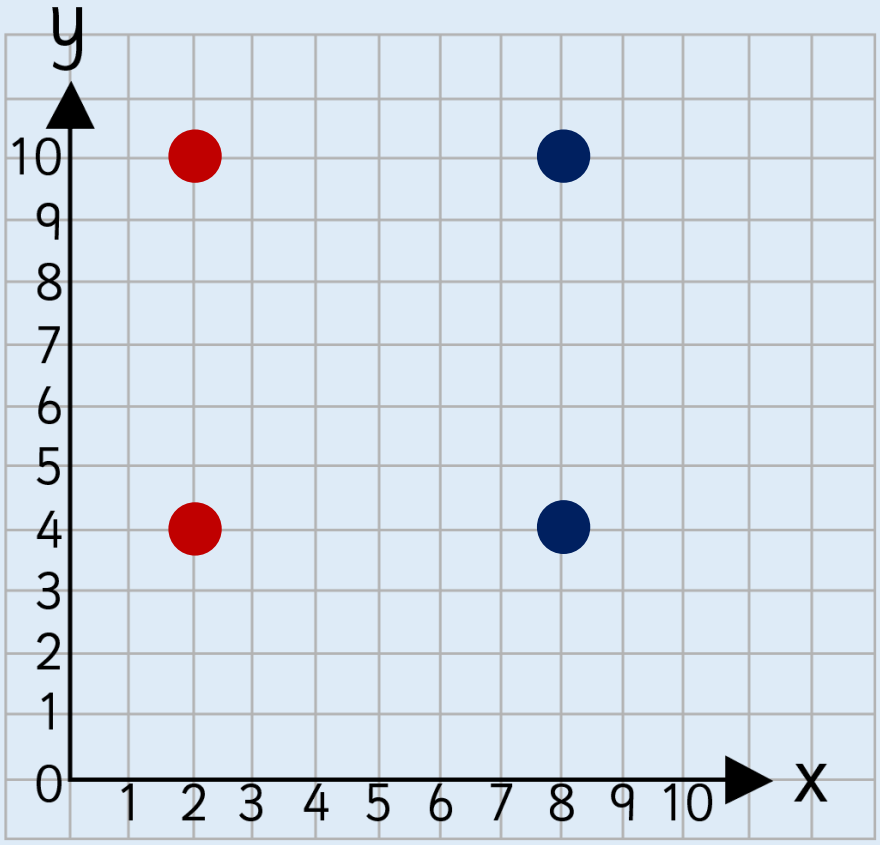

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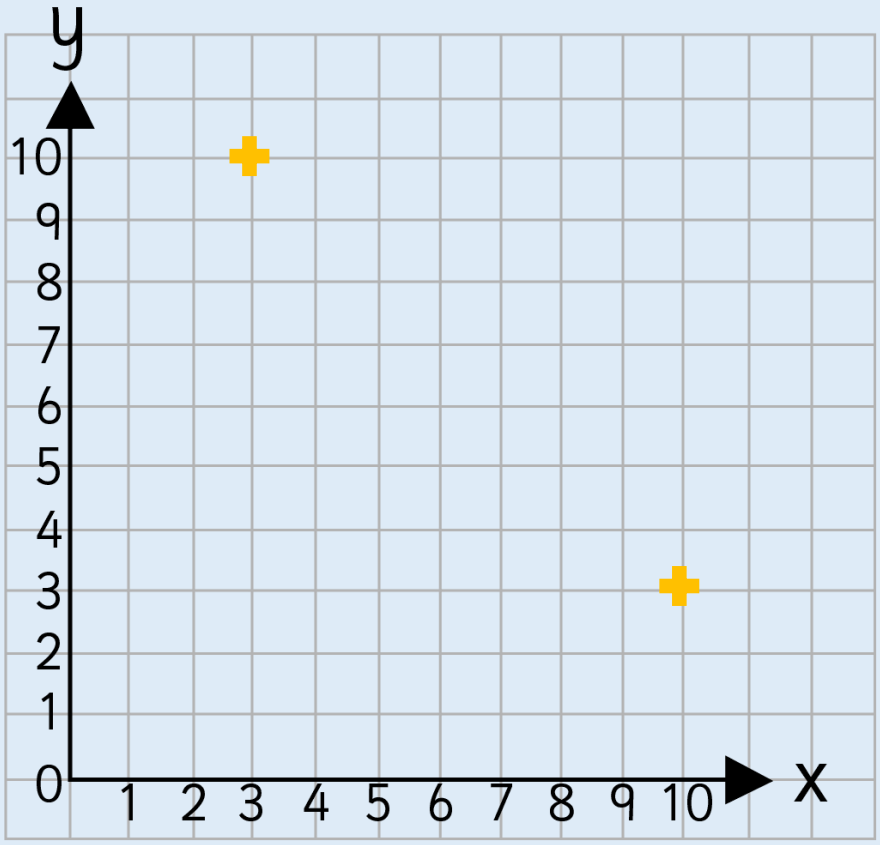

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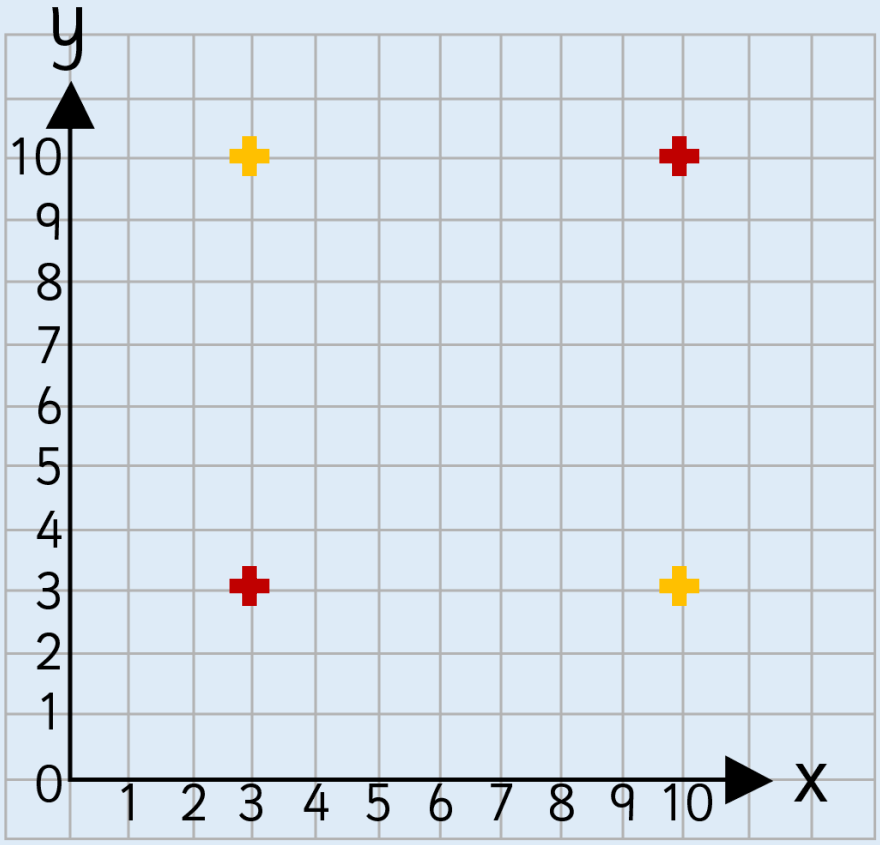


Activity 3 Draw on a Grid

Plot these points on a grid. What shape has been created?

(2, 4) (4, 2)
(5, 8) (7, 6)

In which order do we read and plot the coordinates?

Activity 3 Draw on a Grid

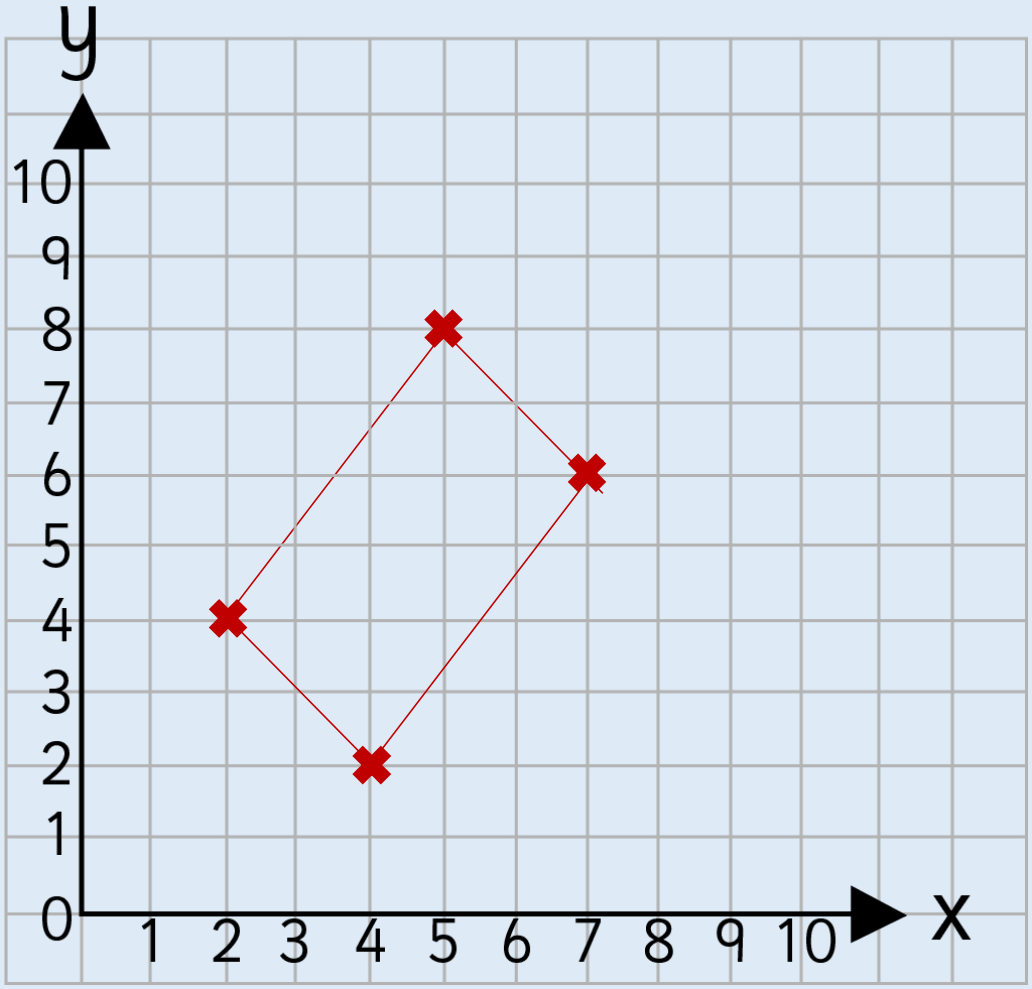
Plot these points on a grid. What shape has been created?

(2, 4)

(4, 2)

(5, 8)

(7, 6)



The shape created is a parallelogram.

Activity 3 Draw on a Grid

Plot these points on a grid. What shape has been created?

(4, 3) (9, 3)

(4, 10) (9, 10)

Activity 3 Draw on a Grid

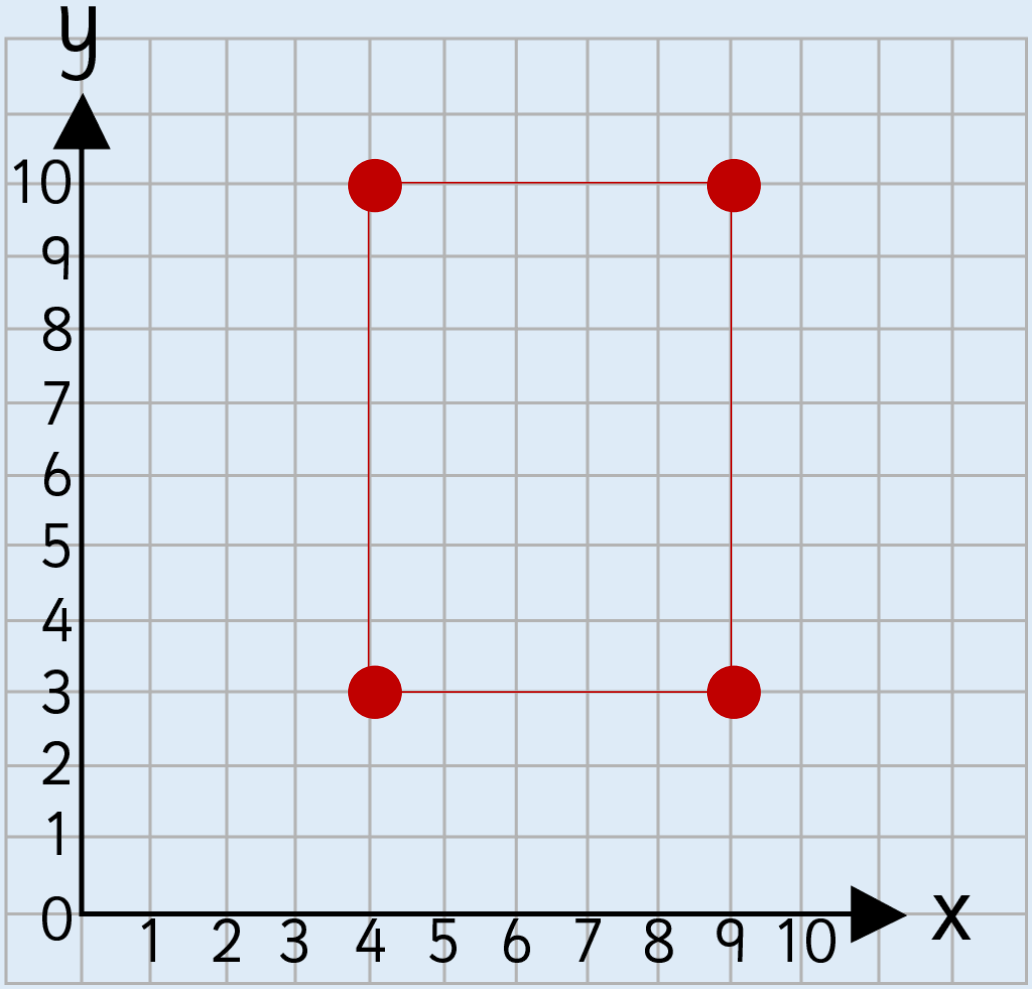
Plot these points on a grid. What shape has been created?

(4, 3)

(9, 3)

(4, 10)

(9, 10)



The shape created is a rectangle or parallelogram.

Activity 3 Draw on a Grid

Plot these points on a grid. What shape has been created?

(2, 1) (10, 1) (6, 6)

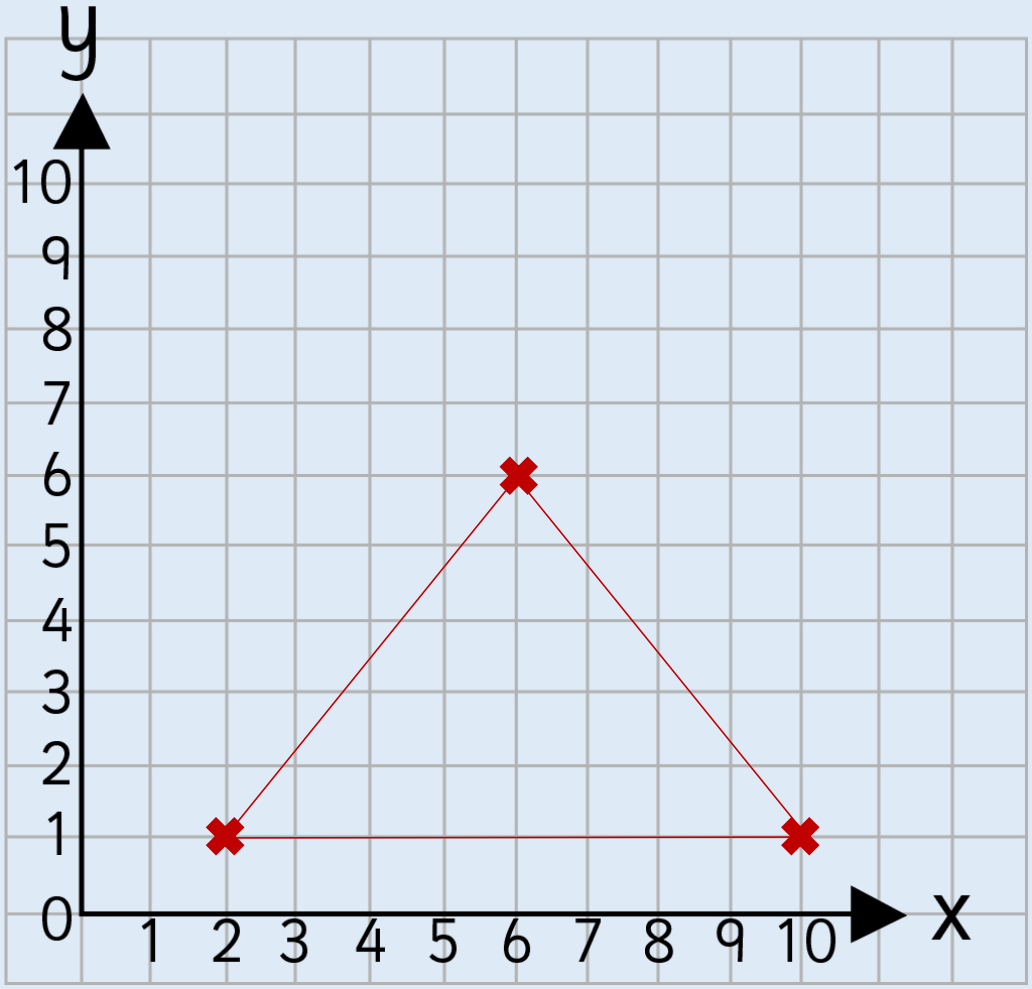
Activity 3 Draw on a Grid

Plot these points on a grid. What shape has been created?

(2, 1)

(10, 1)

(6, 6)

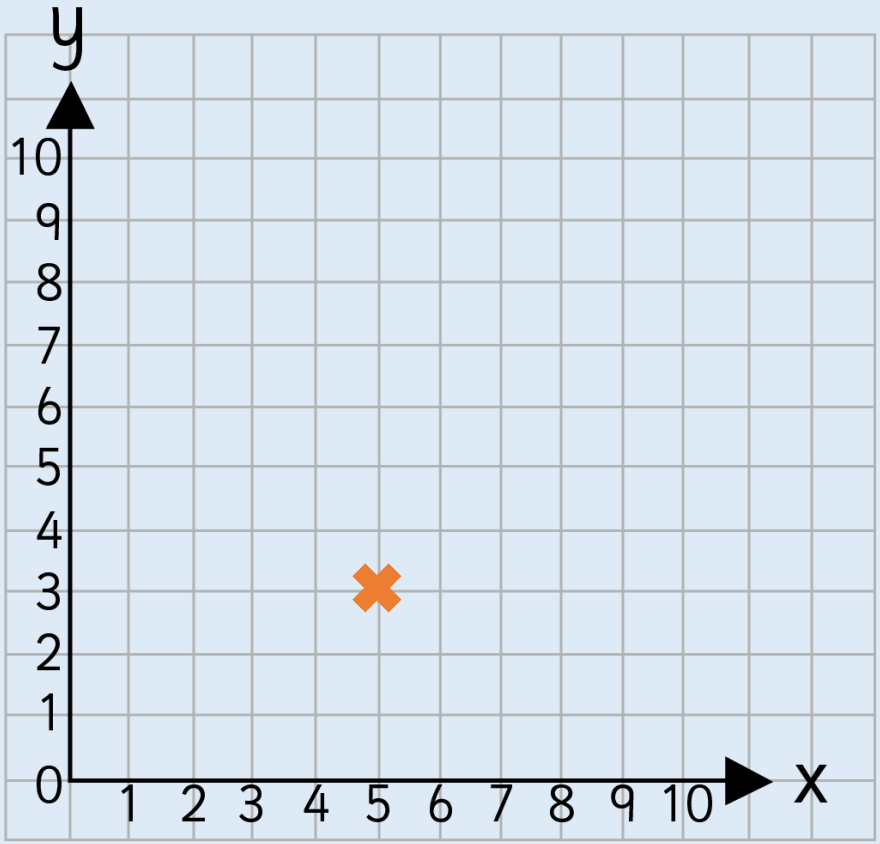


The shape created is a triangle.

Reasoning 1

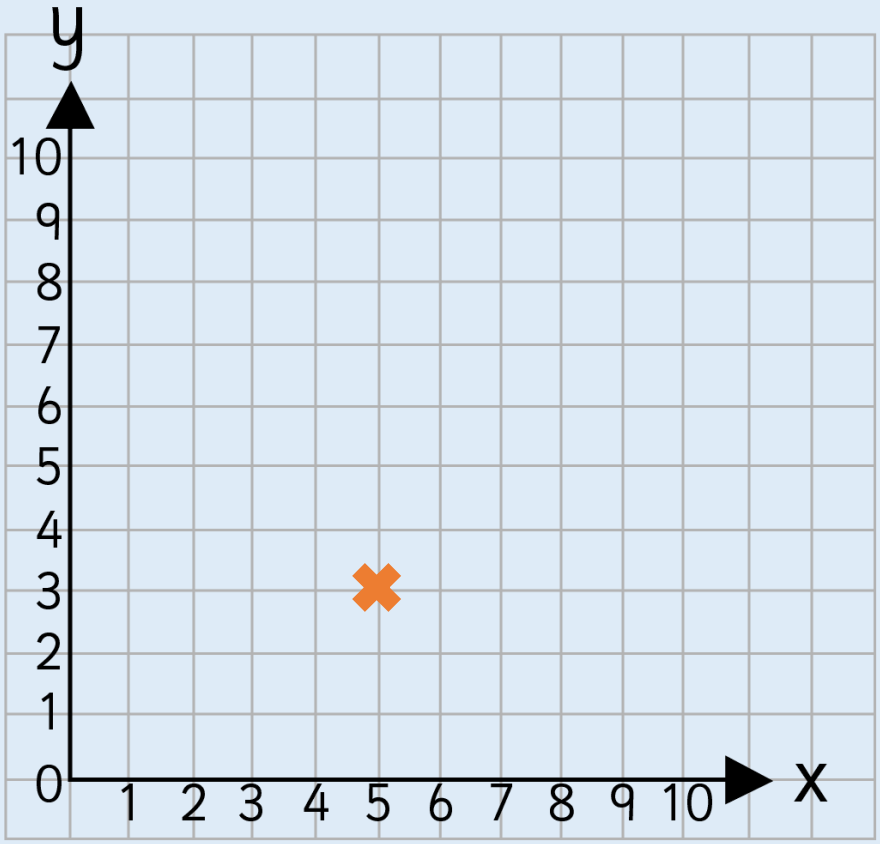
Draw on a Grid

What shapes could be made by plotting three more points?



Reasoning 1 Draw on a Grid

What shapes could be made by plotting three more points?



The children could make a range of quadrilaterals depending on where they plot the points. If children plot the three points in a line they could make a triangle.

Reasoning 2 Draw on a Grid

Malachi

When you are plotting a point on a grid it does not matter whether you go up or across first as long as you do one number on each axis.

Do you agree with Malachi? Convince me.

Reasoning 2 Draw on a Grid

Malachi

When you are plotting a point on a grid it does not matter whether you go up or across first as long as you do one number on each axis.

Malachi is incorrect. The x-axis must be plotted before the y-axis. Children can prove this by plotting a pair of coordinates both ways and showing the difference.

Reasoning 3 Draw on a Grid

Always, Sometimes, Never?

"The number of points is equal to the number of vertices when they are joined together."

Reasoning 3 Draw on a Grid

Always, Sometimes, Never?

"The number of points is equal to the number of vertices when they are joined together."

Sometimes. If points are plotted in a straight line they will not create a vertex.

Discussion

Draw on a Grid

Do we plot our point on the line, or next to the line?

How could we use a ruler to help plot points?

In which order do we read and plot the coordinates?

Does it matter which way we plot the numbers on the axis?

What are the coordinates of ____?
Where would (___, ___) be?
Can you show ____ on the grid?

Move on a Grid

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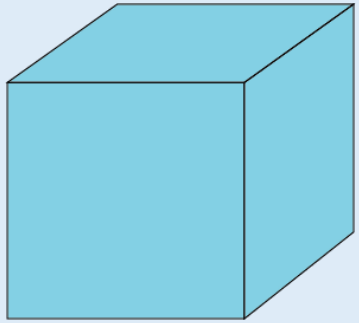
Activity 1 Move on a Grid

Place a small cube on the grid at coordinate (1, 1).
Move your cube one unit up. Move your cube one unit down.
What do you notice? Now move your cube three units to the right.
Move your cube three units to the left. What do you notice?



What do you notice about the new and original points?

Activity 1 Move on a Grid

Place a small cube on the grid at coordinate (1, 1).
Move your cube one unit up. Move your cube one unit down.
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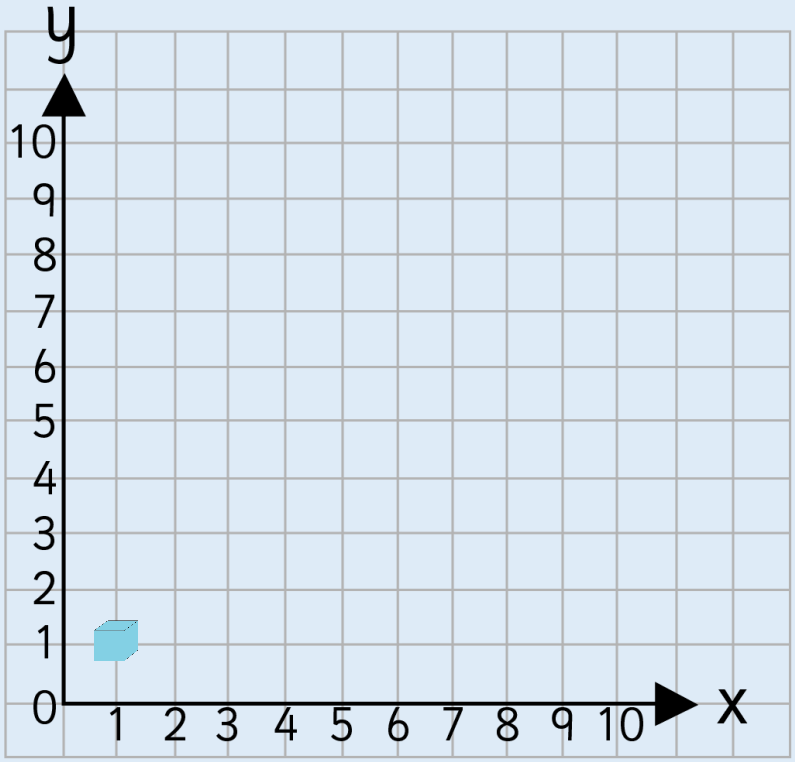
Move your cube three units to the left. What do you notice?

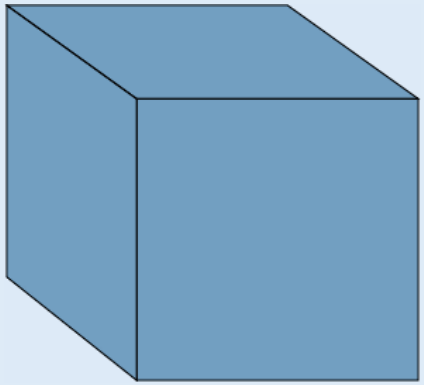


Moving one unit up and down will return the cube to its original coordinates.

Moving three units to the right and left will also return the cube to its original coordinates.

Activity 1 Move on a Grid

Place a small cube on the grid at coordinate (3, 3).
Move your cube two units up. Move your cube two units down.
What do you notice? Now move your cube three units to the right.
Move your cube three units to the left. What do you notice?

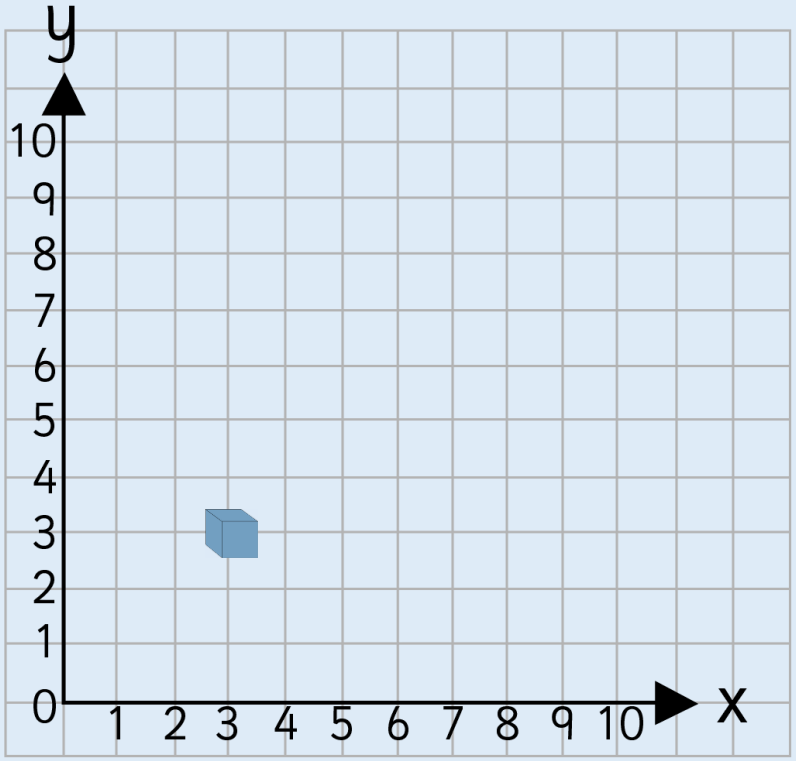


Activity 1 Move on a Grid

Place a small cube on the grid at coordinate (3, 3).
Move your cube two units up. Move your cube two units down.
What do you notice? Now move your cube three units to the right.
Move your cube three units to the left. What do you notice?

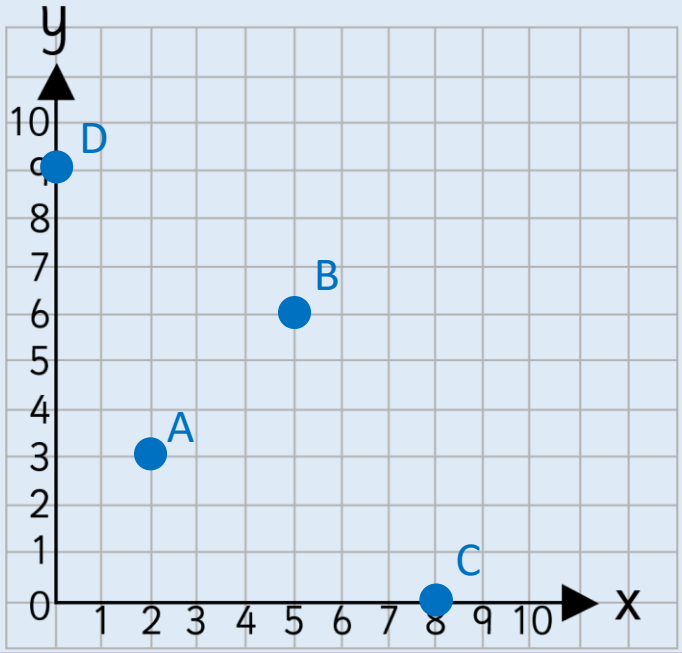
Moving two units up and down will return the cube to its original coordinates.

Moving three units to the right and left will also return the cube to its original coordinates.



Activity 2 Move on a Grid

Translate A 6 right and 3 down. Record the coordinates before (___, ___) and after (___, ___). Translate B and C 4 left and 3 up. Record the coordinates before (___, ___) and after (___, ___).



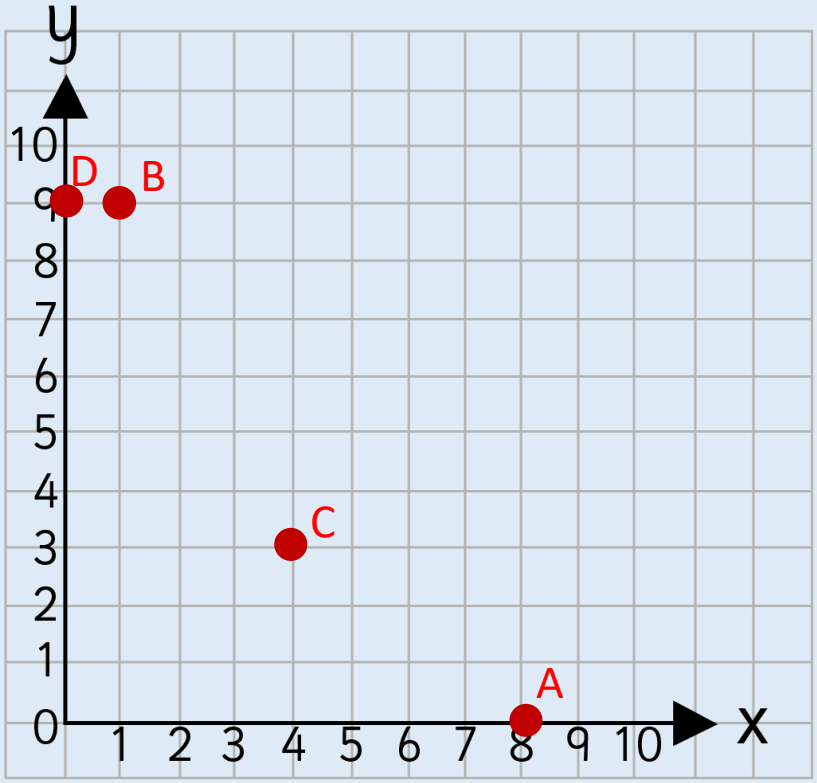
Can you describe the translation?

Activity 2 Move on a Grid

Translate A 6 right and 3 down. Record the coordinates before (___, ___) and after (___, ___). Translate B and C 4 left and 3 up. Record the coordinates before (___, ___) and after (___, ___).

Before:
A (2, 3)
B (5, 6)
C (8, 0)
D (0, 9)

After:
A (8, 0)
B (1, 9)
C (4, 3)
D (0, 9)



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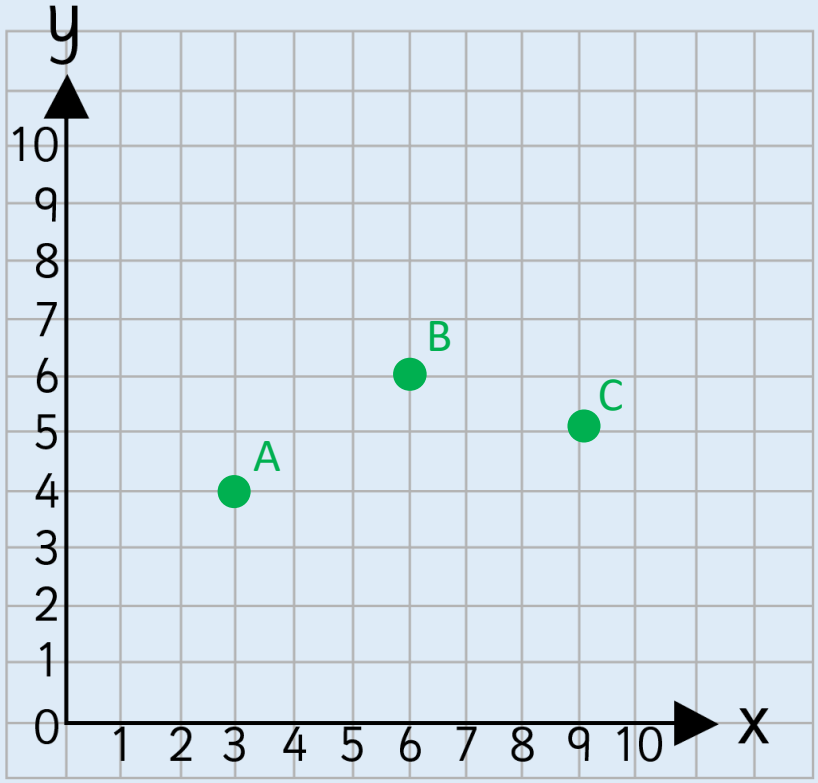
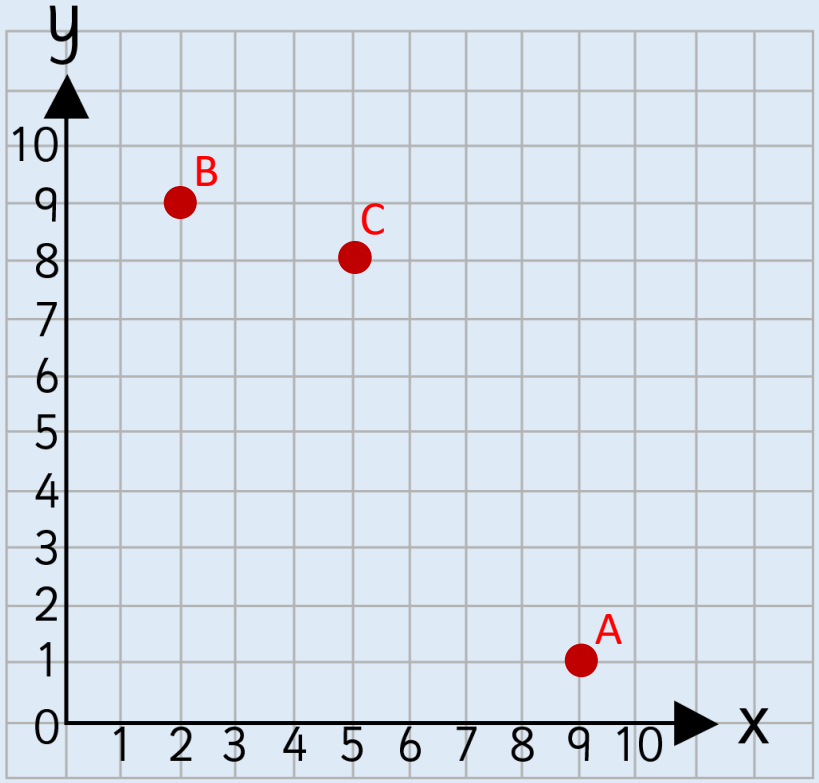


Activity 2 Move on a Grid

Translate A 6 right and 3 down. Record the coordinates before (___, ___) and after (___, ___). Translate B and C 4 left and 3 up. Record the coordinates before (___, ___) and after (___, ___).

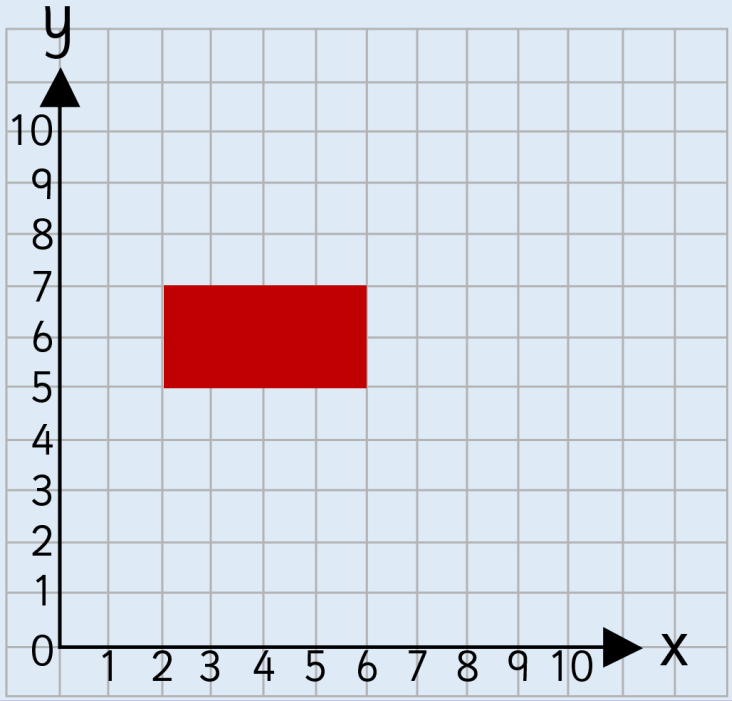
Before:
A (3, 4)
B (6, 6)
C (9, 5)

After:
A (9, 1)
B (2, 9)
C (5, 8)



Activity 3 Move on a Grid

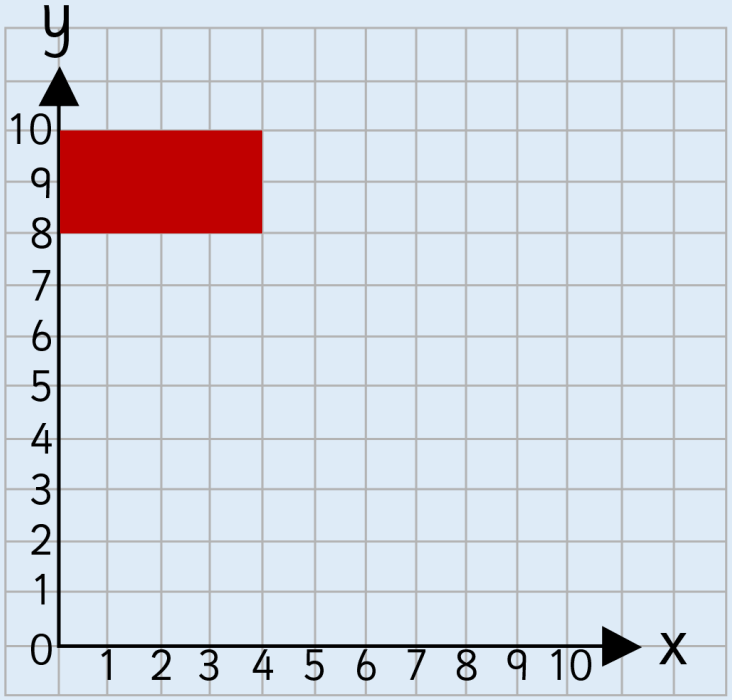
Translate the rectangle 2 left and 3 up.
Write down the coordinates of each vertex of the rectangle before and after translation.



Can you describe the translation in reverse?

Activity 3 Move on a Grid

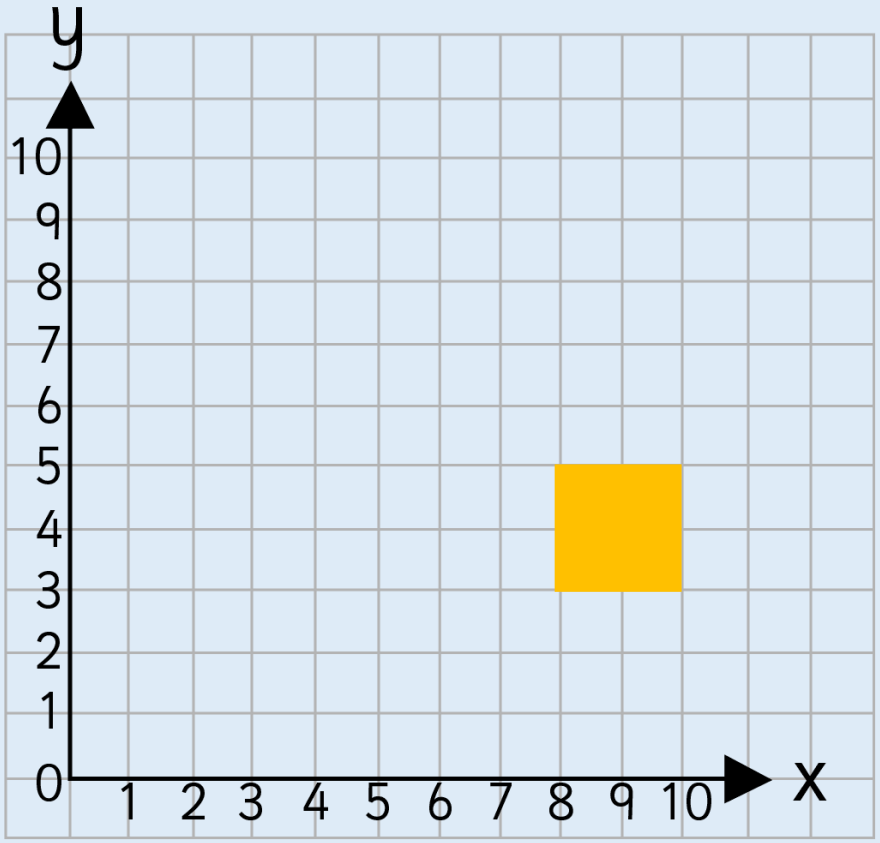
Translate the rectangle 2 left and 3 up.
Write down the coordinates of each vertex of the rectangle before and after translation.



Before: (2, 5), (6, 5), (6, 7), (2, 7)
After: (0, 8), (4, 8), (4, 10), (0, 10)

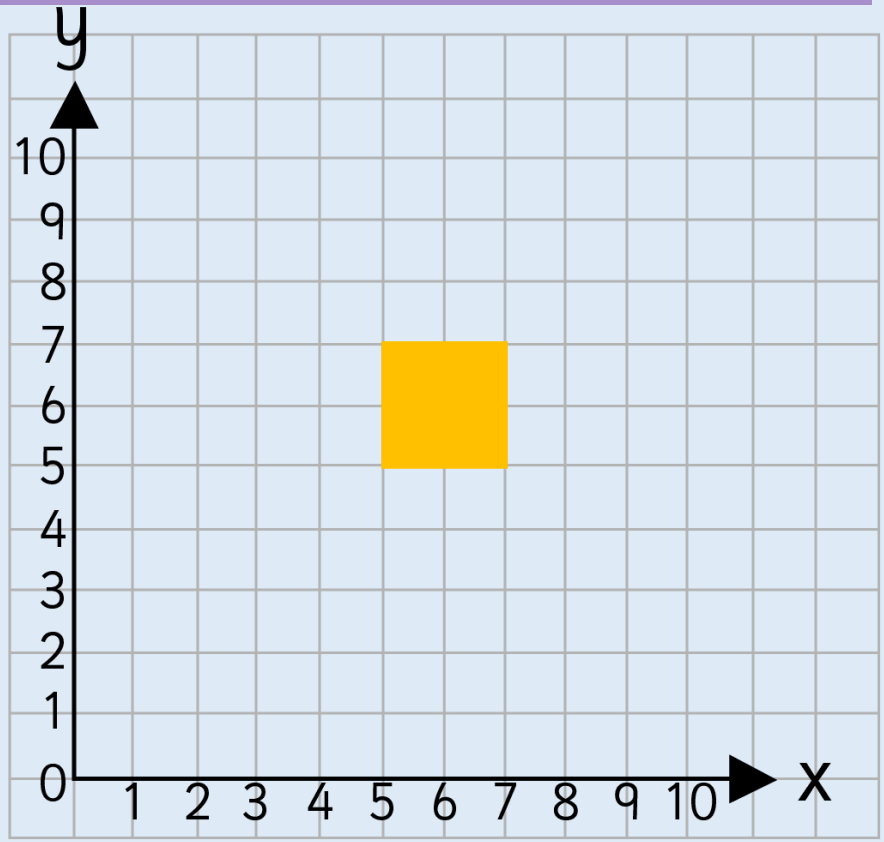
Activity 3 Move on a Grid

Translate the square 3 left and 2 up.
Write down the coordinates of each vertex of the square before and after translation.



Activity 3 Move on a Grid

Translate the square 3 left and 2 up.
Write down the coordinates of each vertex of the square before and after translation.

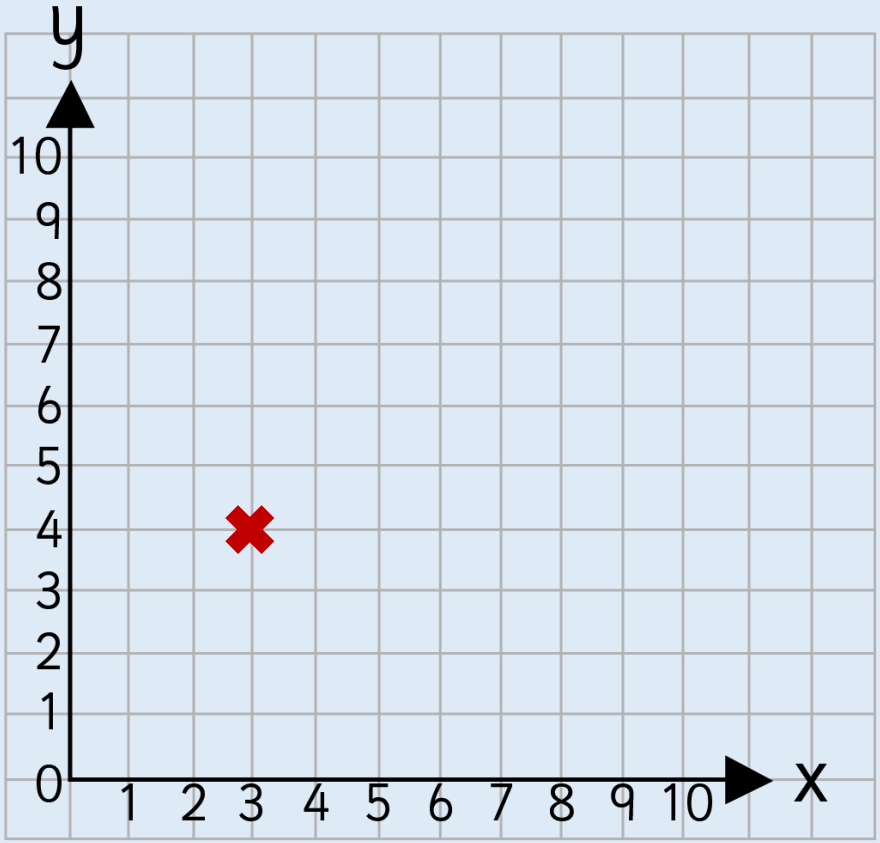


Before:
(8, 3), (10, 3), (10, 5), (8, 5)

After:
(5, 5), (7, 5), (7, 7), (5, 7)

Reasoning 1 Move on a Grid

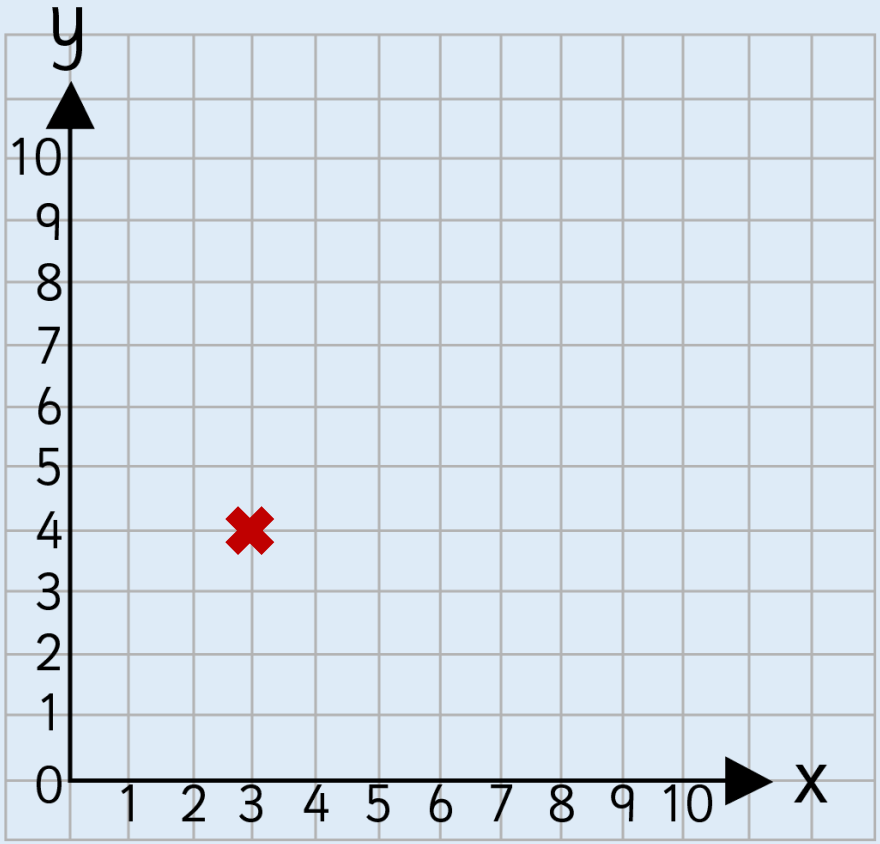
Rosie translates the point (3, 4), but realises that it has returned to the same position.



What translation did she do? Is there more than one answer?

Reasoning 1 Move on a Grid

Rosie translates the point (3, 4), but realises that it has returned to the same position.



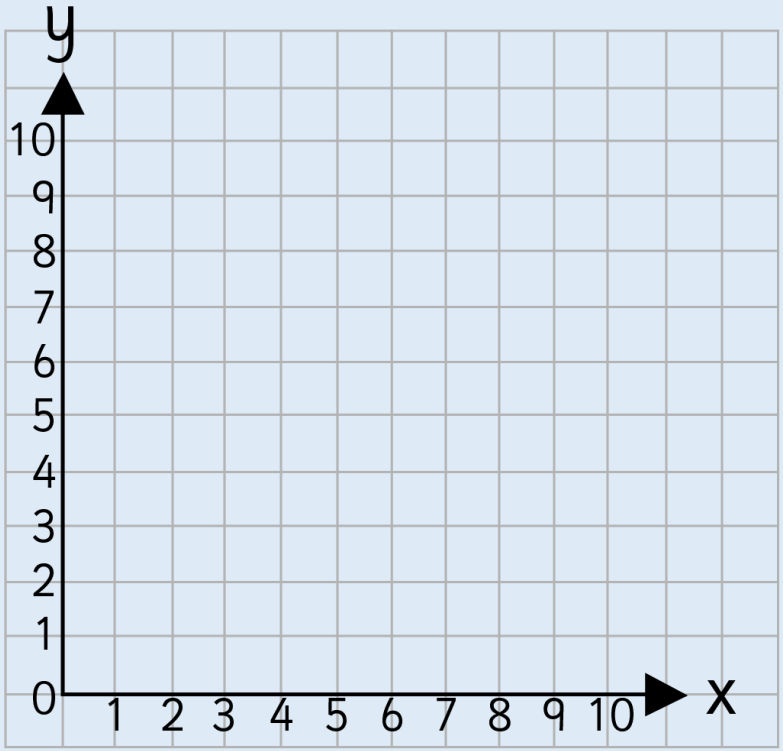
There could be a range of answers, for example:

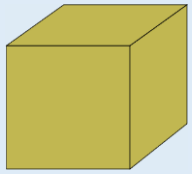
Translate 1 left, 1 right; 2 up, 2 down etc.

Reasoning 2 Move on a Grid

Here is a game to play in pairs.

Each player needs:





One small cube

One barrier (e.g. a mini whiteboard)

Reasoning 2 Move on a Grid

Here is a game to play in pairs.

- The first player places a cube on their grid. They describe the original position and perform a translation.
- The second player listens to the instructions and performs the same translation.
- They check to see if they have placed their cube at the same coordinate(s).
- Swap roles and repeat several times.

Reasoning 2 Move on a Grid

Here is a game to play in pairs.

The teacher could make this more competitive (points awarded when correct).

Discussion

Move on a Grid

Can you describe the translation?
Can you describe the translation in reverse?

Why do we go left and right first when describing translations?
What are the coordinates for point ____?

Write a translation for D for your partner to complete.
What do you notice about the new and original points?

What is the same and what is different about the new and original points?

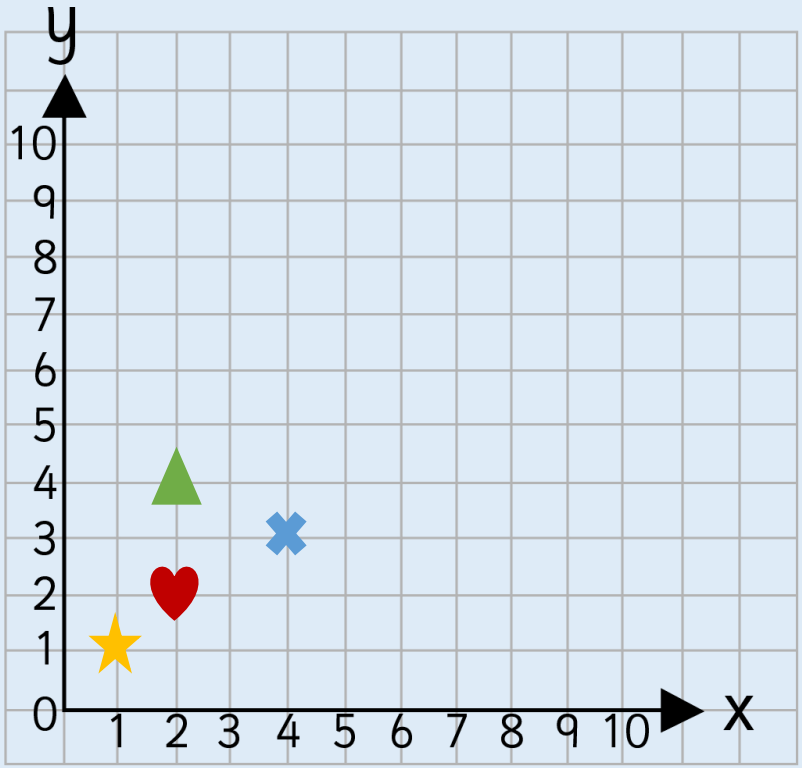
Describe Movement

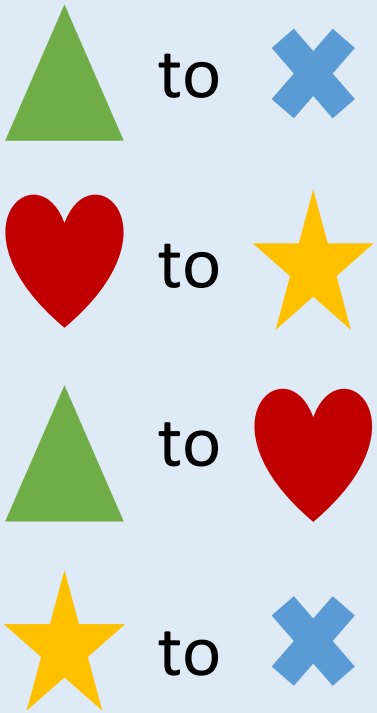
4

Fluency & Reasoning Teaching Slides

Activity 1 Describe Movement

Describe the translation from:

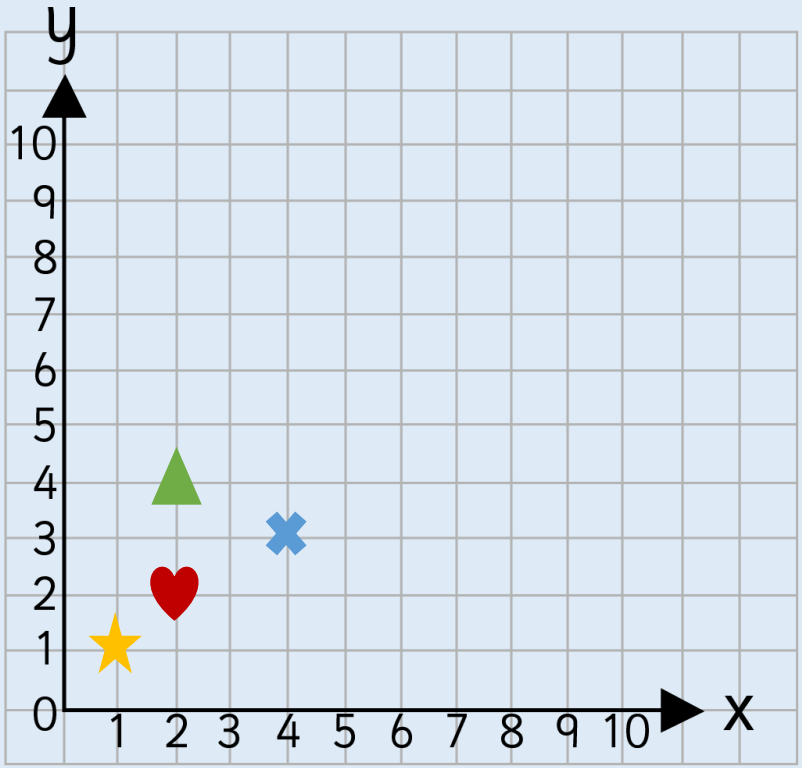




Can you describe the translation in reverse?

Activity 1 Describe Movement

Describe the translation from:



▲ to ✖ 2 right and 1 down.

♥ to ★ 1 left and 1 down.

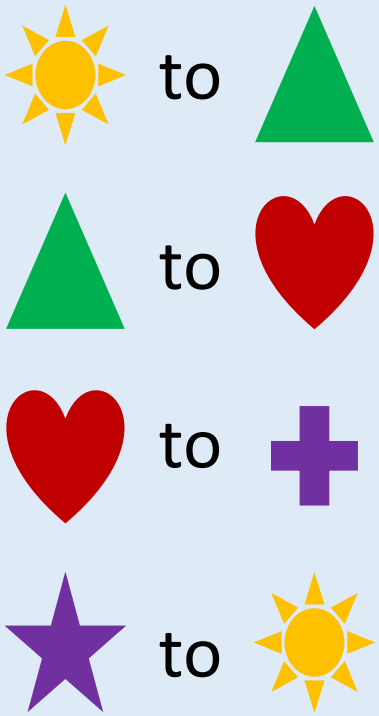
▲ to ♥ 2 down.

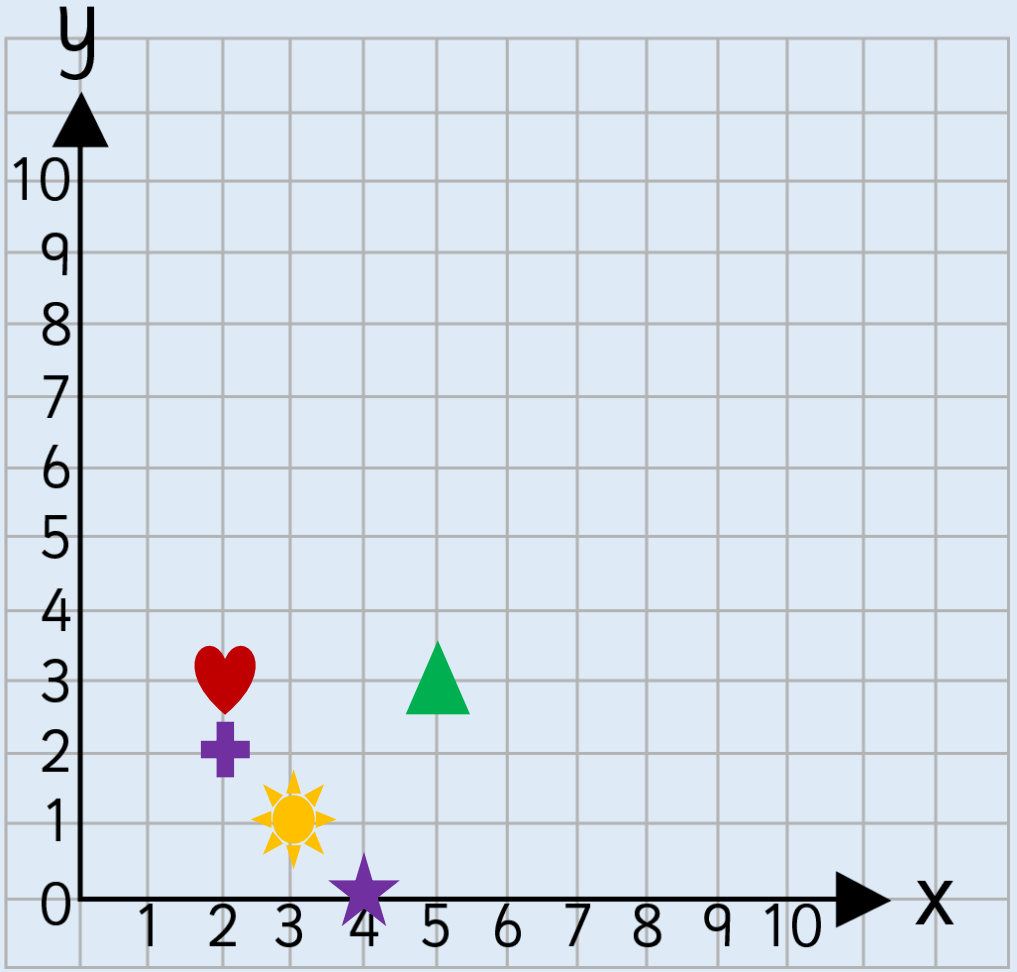
★ to ✖ 3 right and 2 up.

Activity 1

Describe Movement

Describe the translation from:





Activity 1 Describe Movement

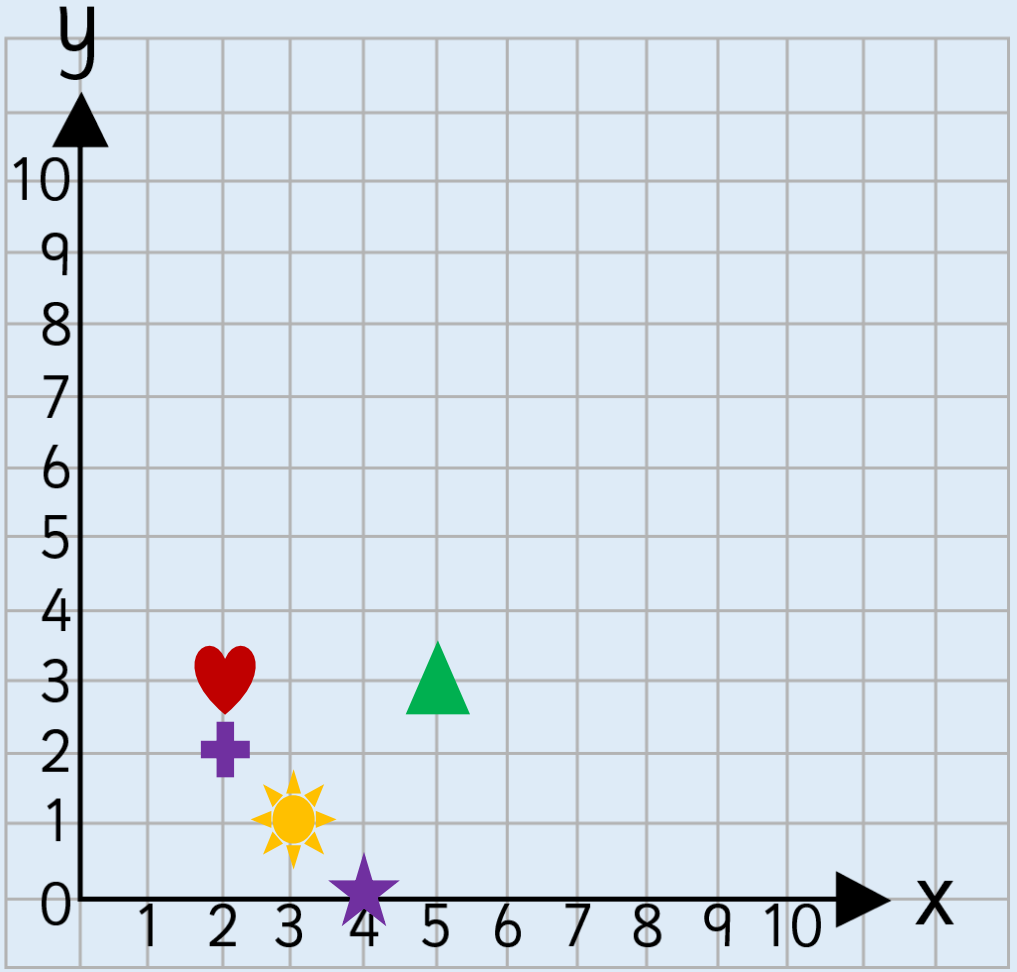
Describe the translation from:

 to  2 right and 2 up.

 to  3 to the left.

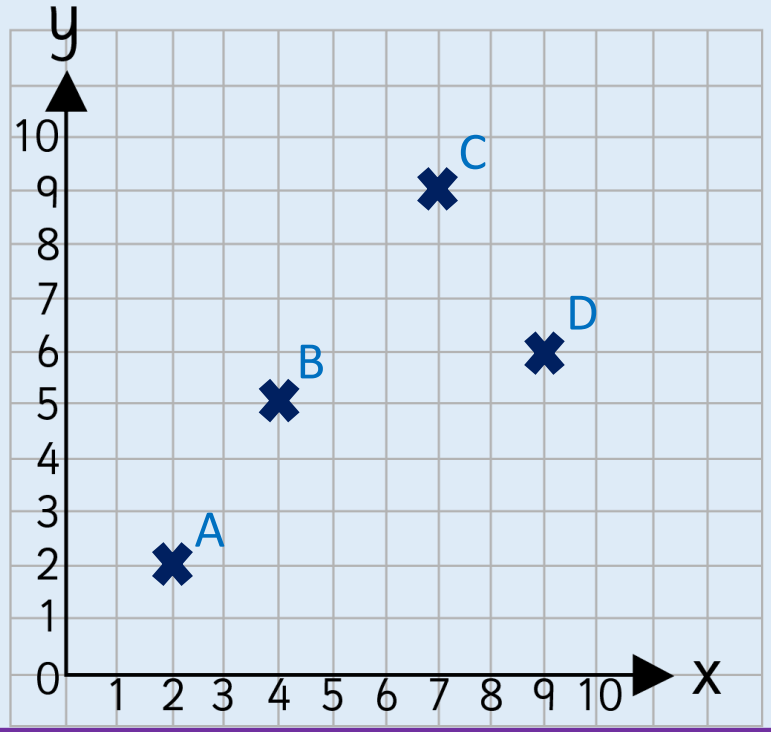
 to  1 down.

 to  1 left and 1 up.



Activity 2 Describe Movement

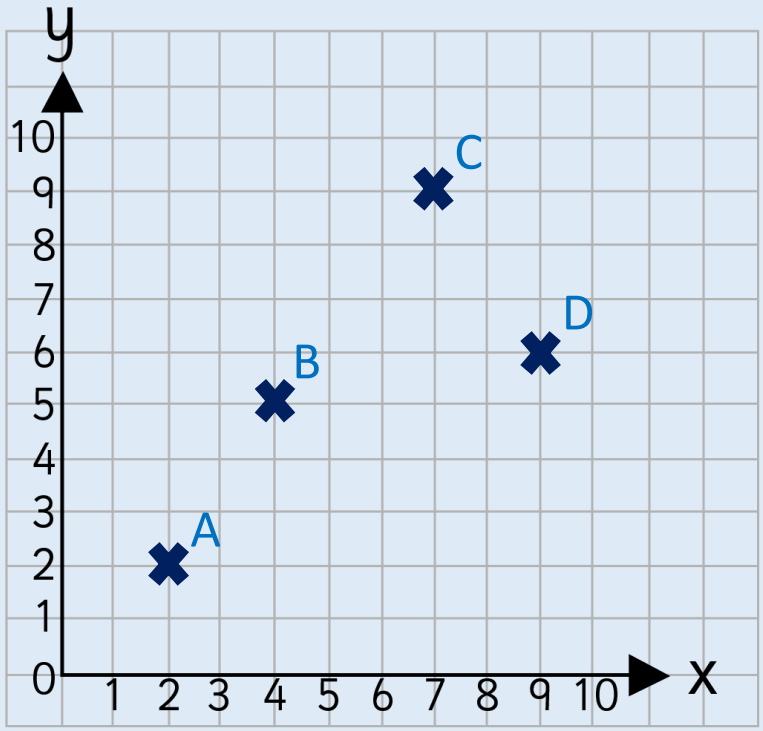
Describe the translation from: A to B, B to C, C to D, D to A. Plot two new points and describe the translations from A to your new points.



Can you describe the translation?

Activity 2 Describe Movement

Describe the translation from: A to B, B to C, C to D, D to A. Plot two new points and describe the translations from A to your new points.



A to B: 2 right and 3 up.

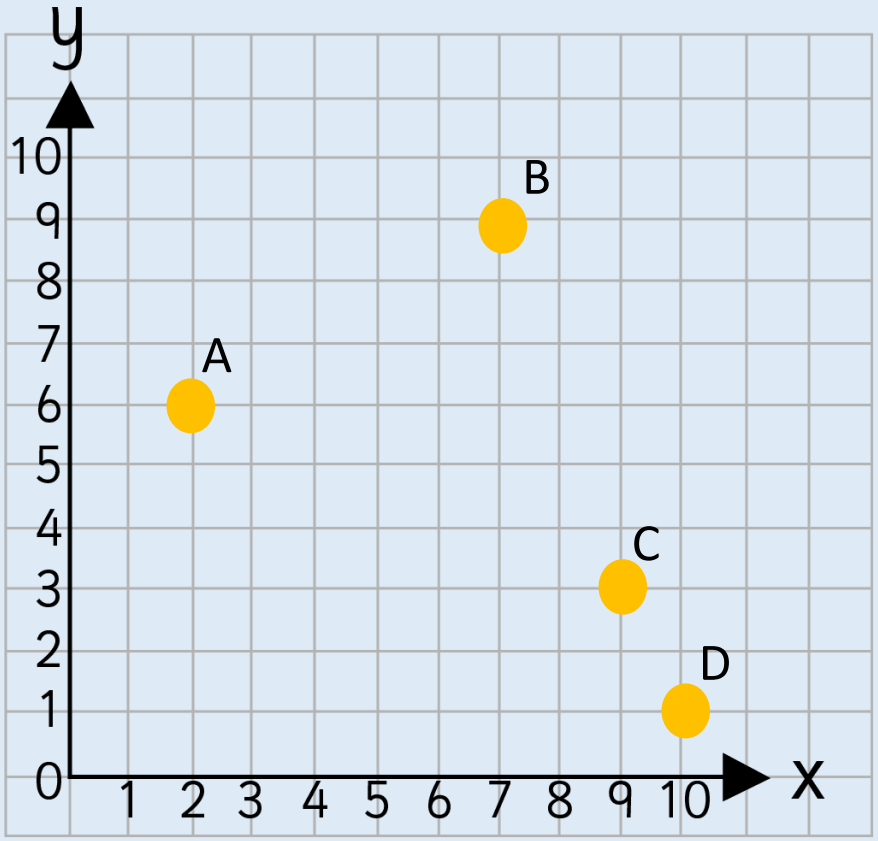
B to C: 3 right and 4 up.

C to D: 2 right and 3 down.

D to A: 7 left and 4 down.

Activity 2 Describe Movement

Describe the translation from: A to B, B to C, C to D, D to A. Plot two new points and describe the translations from A to your new points.



Activity 2 Describe Movement

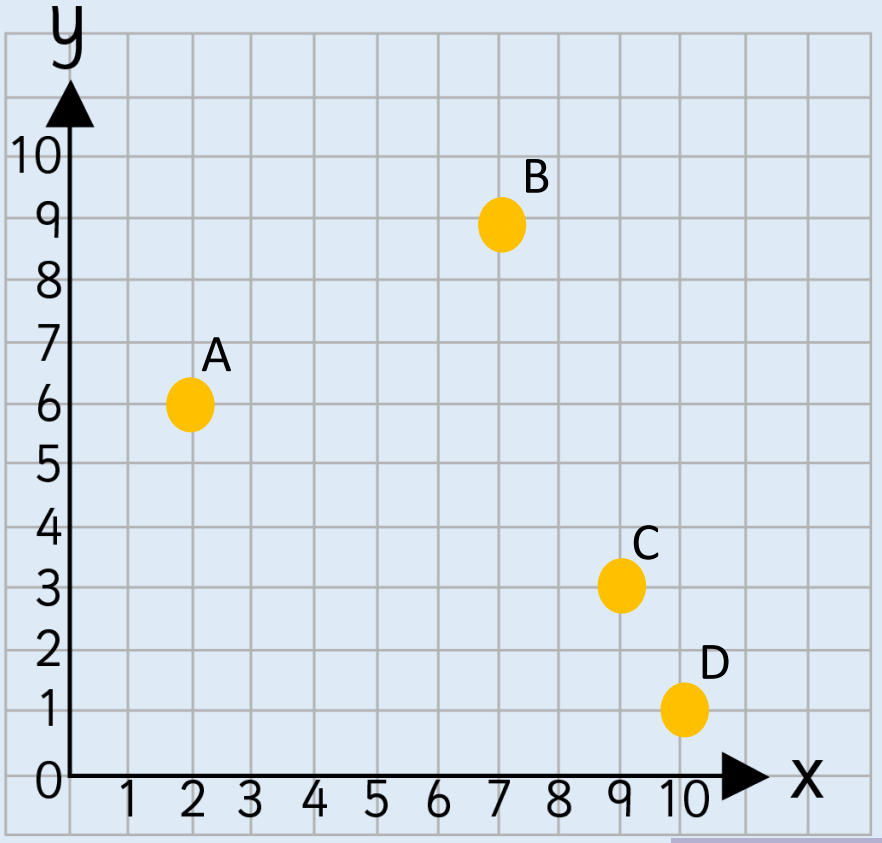
Describe the translation from: A to B, B to C, C to D, D to A. Plot two new points and describe the translations from A to your new points.

A to B: 5 right and 3 up.

B to C: 2 right and 6 down.

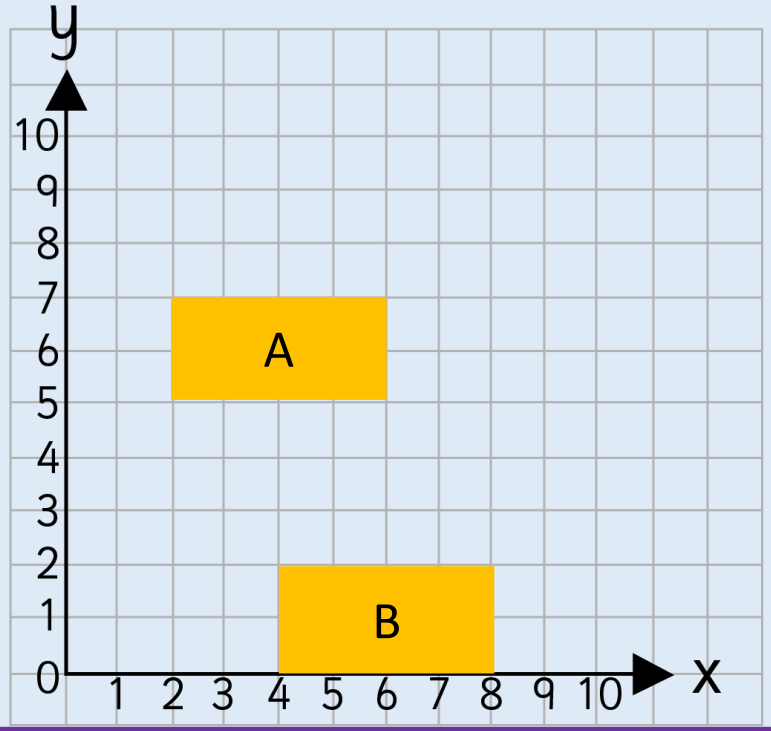
C to D: 1 right and 2 down.

D to A: 8 left and 5 up.



Activity 3 Describe Movement

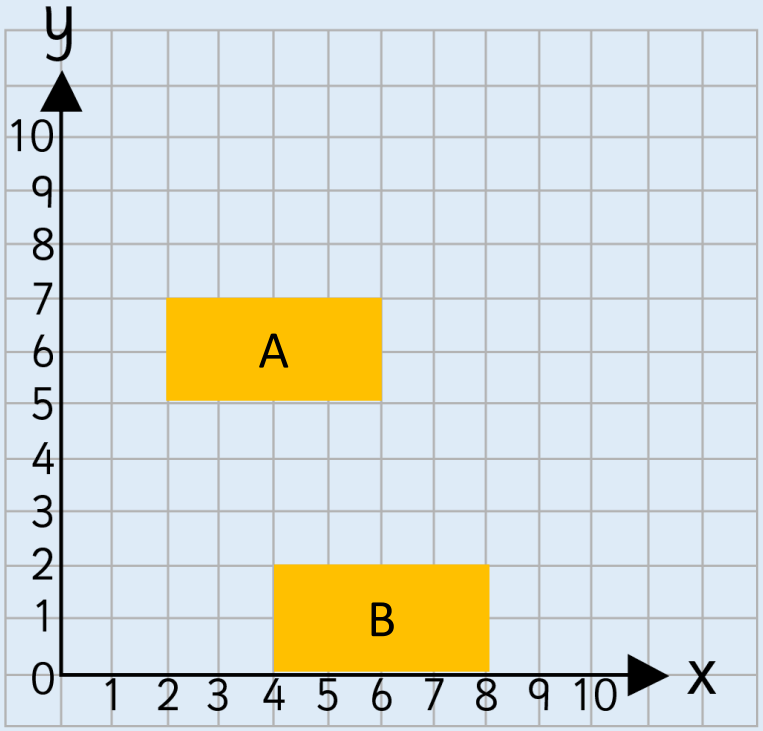
Describe the translation of Shape A to Shape B.
Describe the translation of Shape B to Shape A.
What do you notice?



Shape A has been translated ___ left/right and ___up/down to Shape B.

Activity 3 Describe Movement

Describe the translation of Shape A to Shape B.
Describe the translation of Shape B to Shape A.
What do you notice?

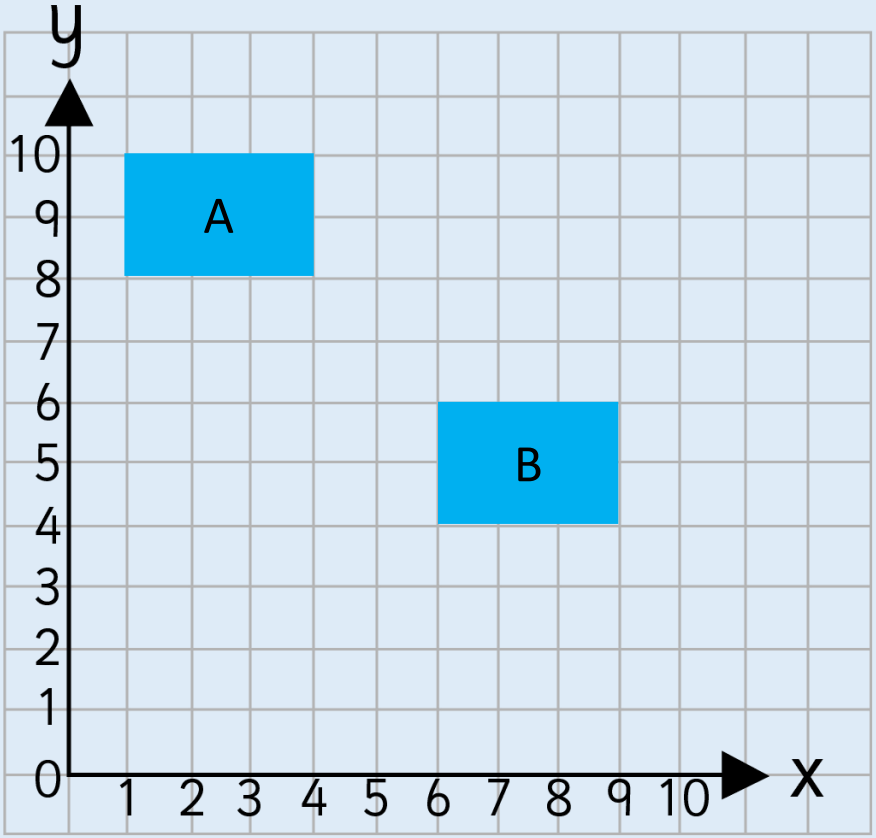


Shape A to Shape B, moved 2 to the right and 5 down.

Shape B to Shape A, moved 2 to the left and 5 up.

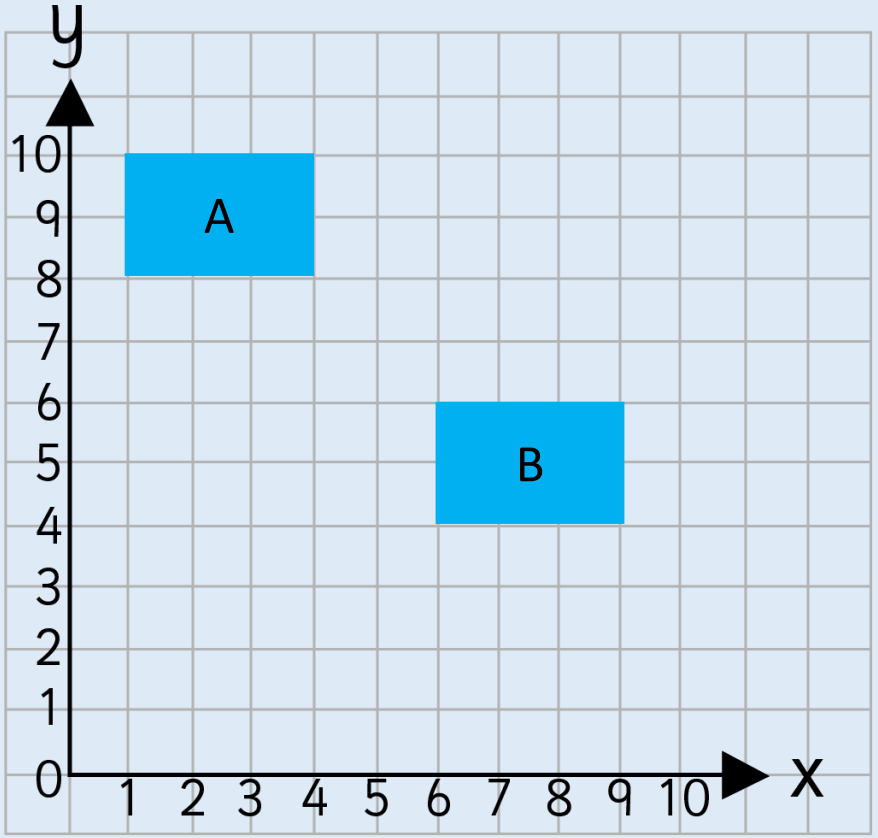
Activity 3 Describe Movement

Describe the translation of Shape A to Shape B.
Describe the translation of Shape B to Shape A.
What do you notice?



Activity 3 Describe Movement

Describe the translation of Shape A to Shape B.
Describe the translation of Shape B to Shape A.
What do you notice?



Shape A to B, moved 5 to the right and 4 down.

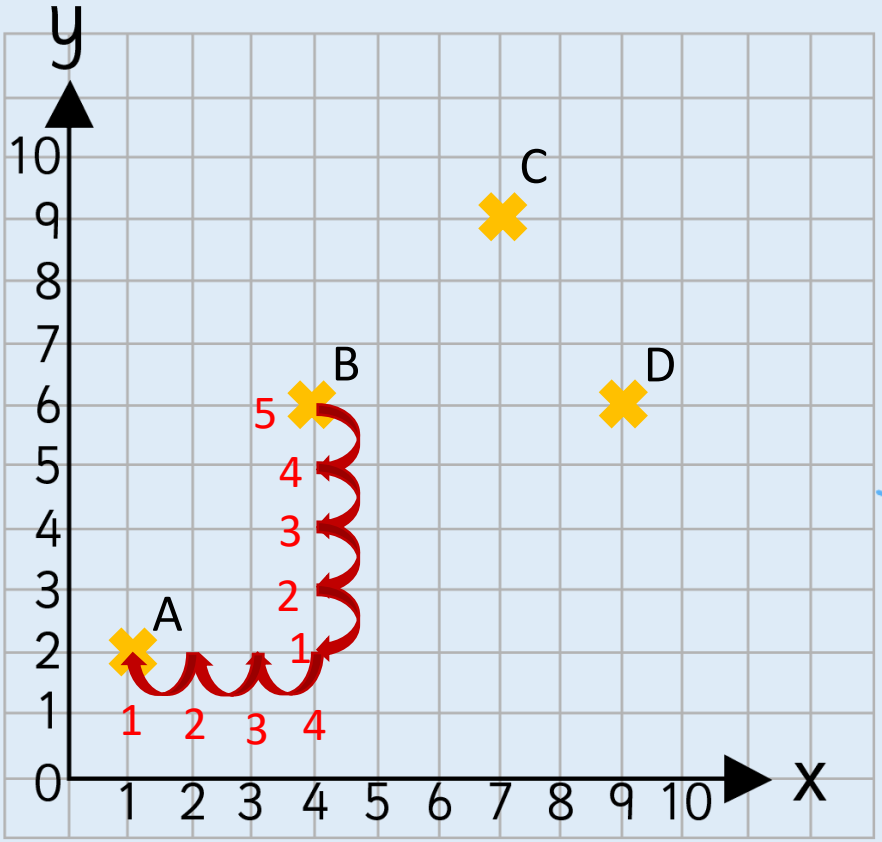
Shape B to A, moved 5 to the left and 4 up.

Reasoning 1

Describe Movement

Leanna has described the translation from A to B as 4 right and 5 up.

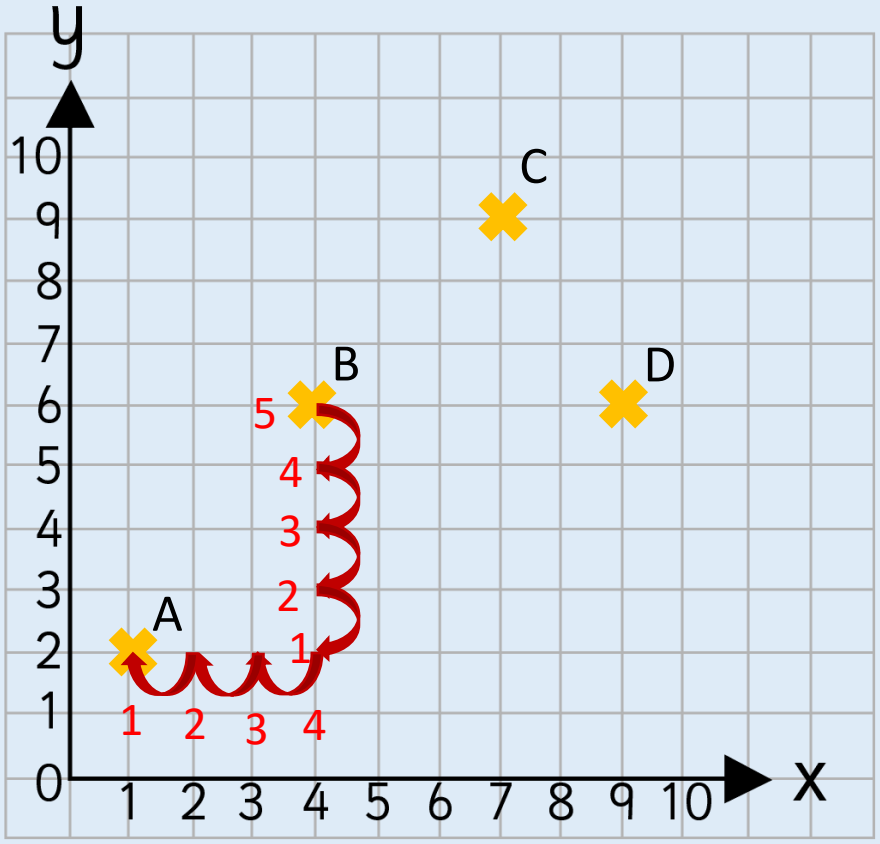
Can you explain her mistake?



Reasoning 1

Describe Movement

Leanna has described the translation from A to B as 4 right and 5 up.

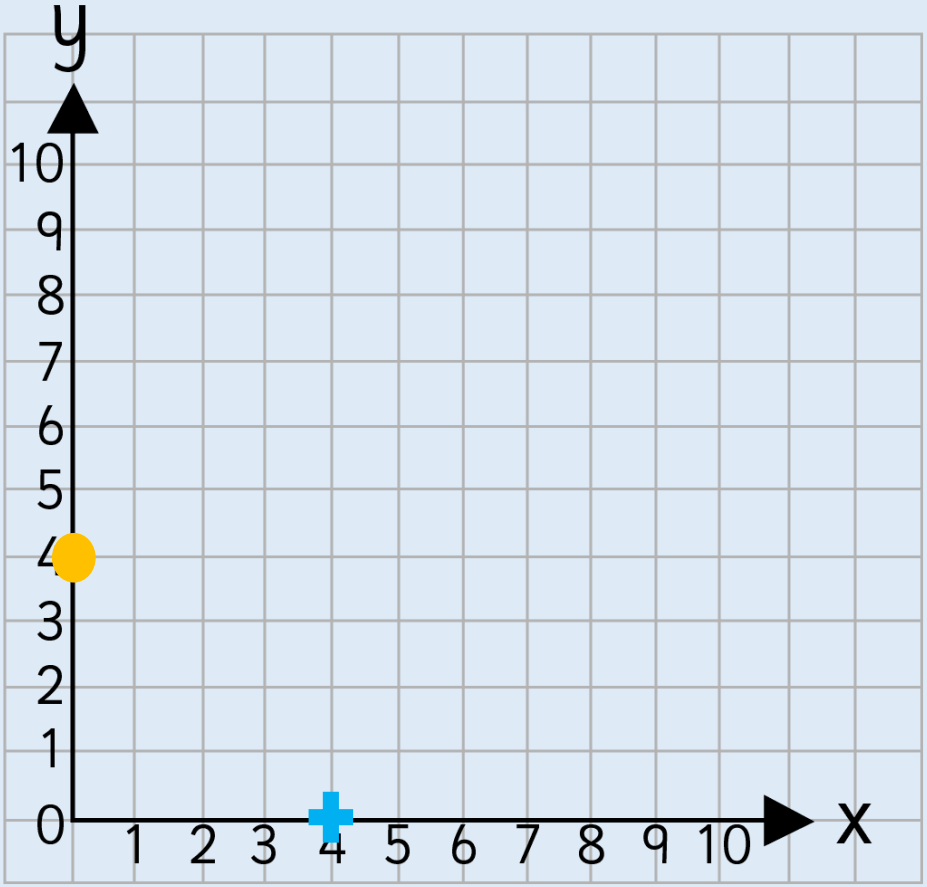


Leanna has counted one move to the right when she has not moved yet. She has done the same for one move up when she has not moved up one space yet.

Reasoning 2 Describe Movement

 to  is 4 right and 4 down.

 to  is 4 left and 4 up.



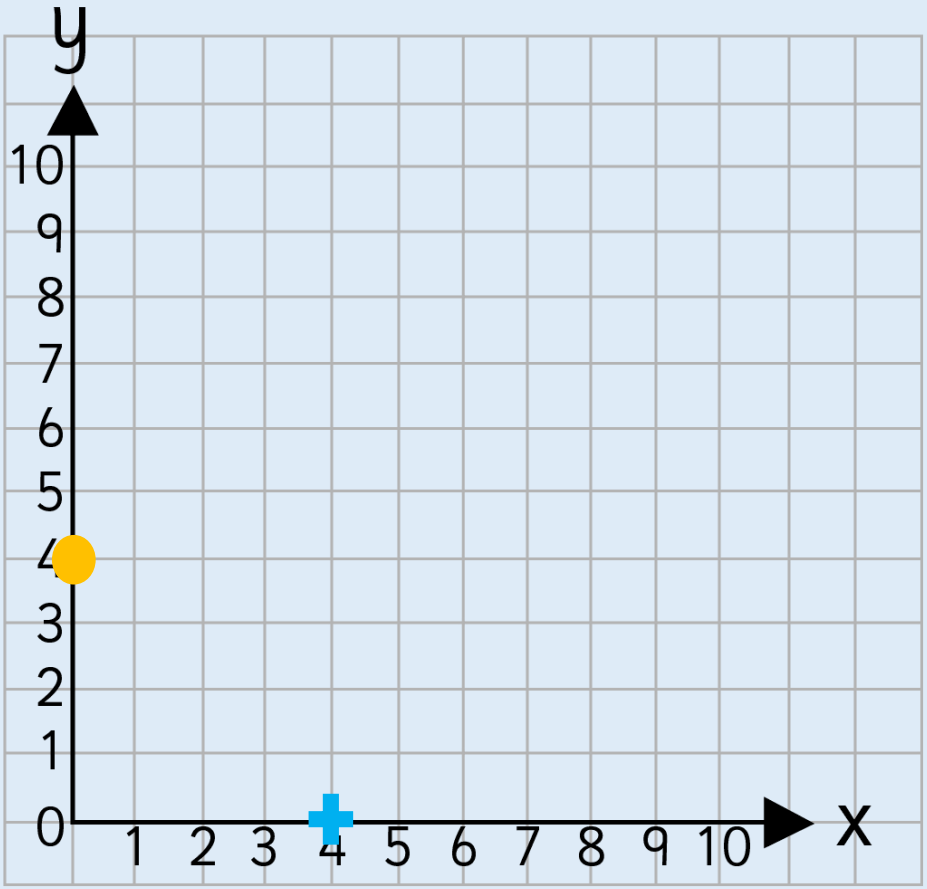
Can you plot other pairs of points where to move between them, you travel the same to left or right as you travel up or down?

What do you notice about the coordinates of these points?

Reasoning 2 Describe Movement

 to  is 4 right and 4 down.

 to  is 4 left and 4 up.



Possible answers include:

(0, 1) (1, 0)
(0, 2) (2, 0)
(0, 3) (3, 0)
(0, 5) (5, 0)
(1, 1) (3, 3)
(0, 0) (4, 4)

Discussion

Describe Movement

Can you describe the translation?

Can you describe the translation in reverse?

Can you complete the following stem sentence:
Shape A has been translated ___left/right and ___up/down to Shape B.