

# Reasoning and Problem Solving

## Step 1: Position in the First Quadrant

### National Curriculum Objectives:

Mathematics Year 5: (5P2) [Identify, describe and represent the position of a shape following a reflection or translation, using the appropriate language, and know that the shape has not changed](#)

### Differentiation:

Questions 1, 4 and 7 (Problem Solving)

**Developing** Use given coordinates to find a letter (simple letter formation). Using up to 4 points, all points plotted on a 5 x 5 grid, using 1:1 scale.

**Expected** Use given coordinates to find a letter. Using up to 6 points, all points plotted on a 10 x 10 grid, using 1:1 scale.

**Greater Depth** Use given coordinates to find a letter. Using up to 6 points, all points plotted on a 10 x 10 grid, using varying scales with some points plotted between increments.

Questions 2, 5 and 8 (Problem Solving)

**Developing** Plot coordinates to create a triangle on the grid. Using up to 4 points, all points plotted on a 5 x 5 grid, using 1:1 scale.

**Expected** Plot coordinates to create a quadrilateral on the grid. Using up to 6 points, all points plotted on a 10 x 10 grid, using 1:1 scale.

**Greater Depth** Plot coordinates to create a polygon on the grid. Using up to 6 points, all points plotted on a 10 x 10 grid, using varying scales with some points plotted between increments.

Questions 3, 6 and 9 (Reasoning)

**Developing** Decide if a statement linked to plotting lines on a grid is true or false and explain reasoning. Using up to 4 points, all points plotted on a 5 x 5 grid, using 1:1 scale.

**Expected** Decide if a statement linked to plotting shapes or basic knowledge of plotting coordinates on a grid is true or false and explain reasoning. Using up to 6 points, all points plotted on a 10 x 10 grid, using 1:1 scale.

**Greater Depth** Decide if a statement linked to knowledge of plotting coordinates on a grid is true or false and explain reasoning. Using up to 6 points, all points plotted on a 10 x 10 grid, using varying scales with some points plotted between increments.

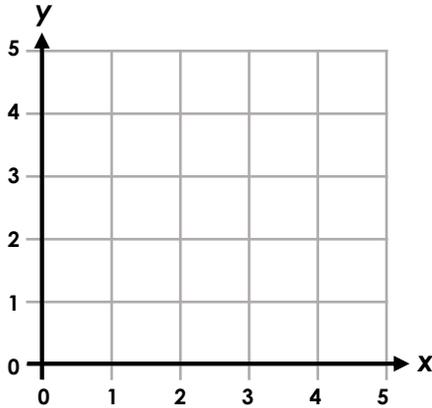
More [Year 5 Position and Direction](#) resources

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## Position in the First Quadrant

1a. The coordinates below will create one letter. Draw and join them on the grid to find out the letter.

(3, 1) (3, 3) (5, 1) (5, 3)

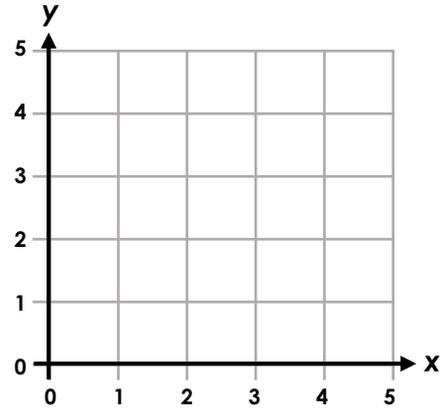


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## Position in the First Quadrant

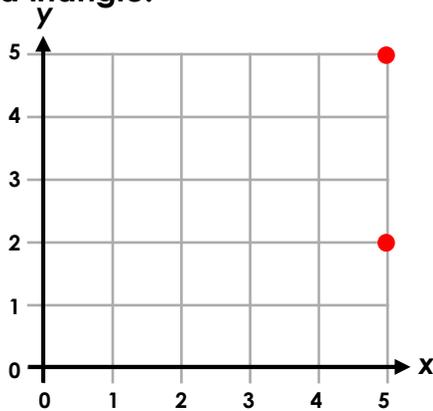
1b. The coordinates below will create one letter. Draw and join them on the grid to find out the letter.

(3, 1) (3, 3) / (2, 3) (4, 3)



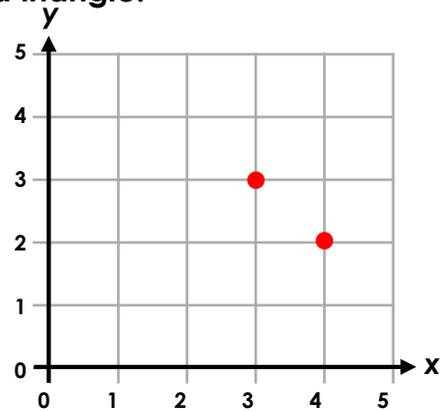
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2a. Two coordinates out of three have already been plotted. Write the rest of the coordinates and join them on the grid to create a triangle.



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2b. Two coordinates out of three have already been plotted. Write the rest of the coordinates and join them on the grid to create a triangle.

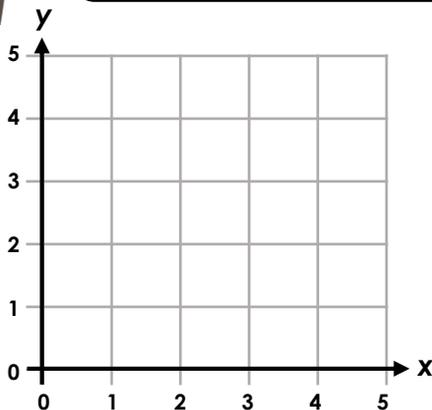


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3a. True or false? Explain your answer.



(1, 4) (1, 3) (1, 2) makes a straight horizontal line.

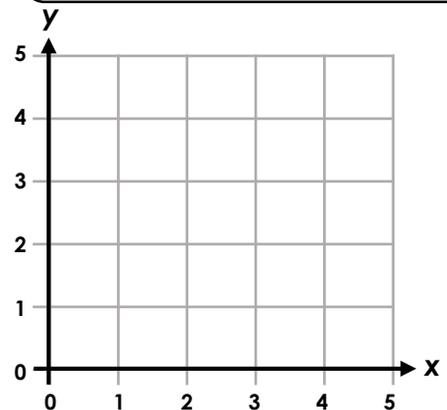


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3b. True or false? Explain your answer.



(3, 4) (2, 4) (1, 4) is a straight line, the next point on the left would be (0, 4) or (4, 4).

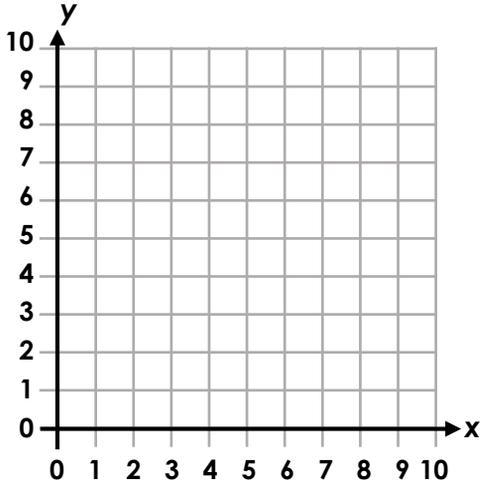


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## Position in the First Quadrant

4a. The coordinates below will create a letter. Draw and join them on the grid to find out the letter.

(1, 1) (1, 6) (3, 6) (3, 4) (1, 4)

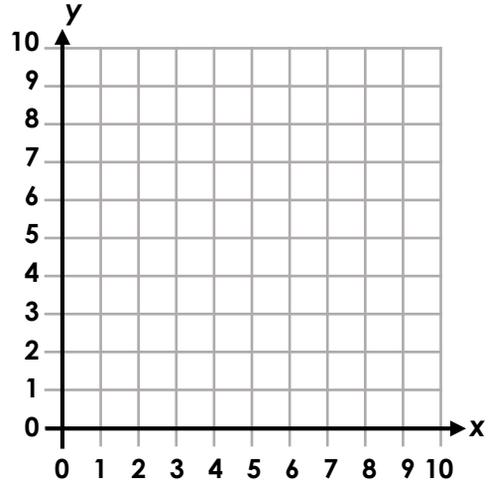


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## Position in the First Quadrant

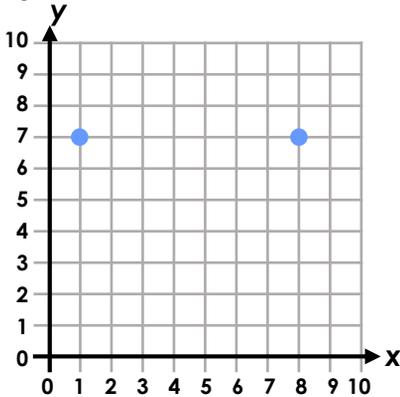
4b. The coordinates below will create a letter. Draw and join them on the grid to find out the letter.

(2, 7) (1, 7) (1, 6) (2, 6) (2, 5) (1, 5)



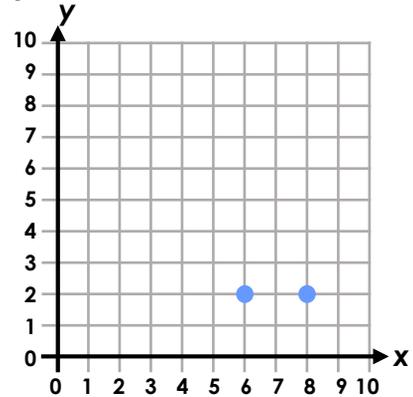
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5a. Two coordinates out of four have already been plotted. Write the rest of the coordinates and join them on the grid to create a quadrilateral.



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5b. Two coordinates out of four have already been plotted. Write the rest of the coordinates and join them on the grid to create a quadrilateral.

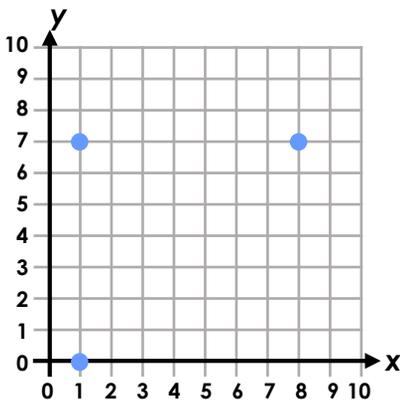


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6a. True or false? Explain your answer.



If I have 3 coordinates of a square, I can calculate the fourth.

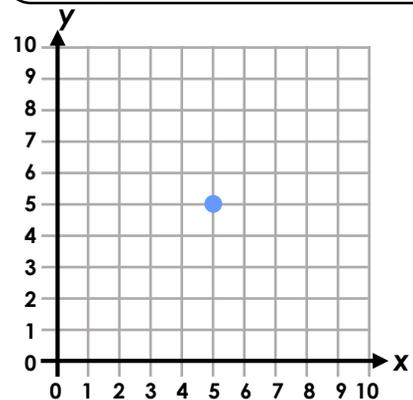


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6b. True or false? Explain your answer.



If only one value changes in a new coordinate, it will make either a horizontal or vertical straight line from where it was.

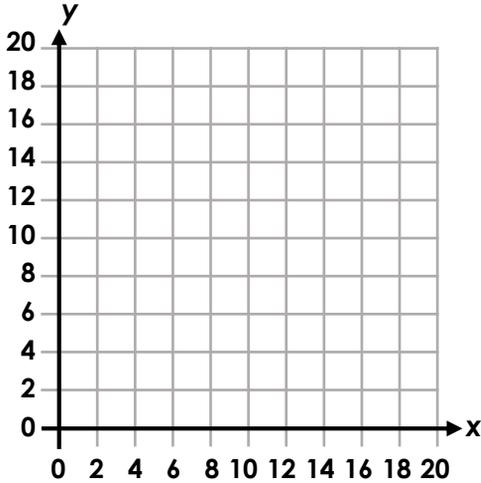


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## Position in the First Quadrant

7a. The coordinates below will create a letter. Draw and join them on the grid to find out the letter.

(4, 6) (4, 16) (8, 12) (12, 16) (12, 6)

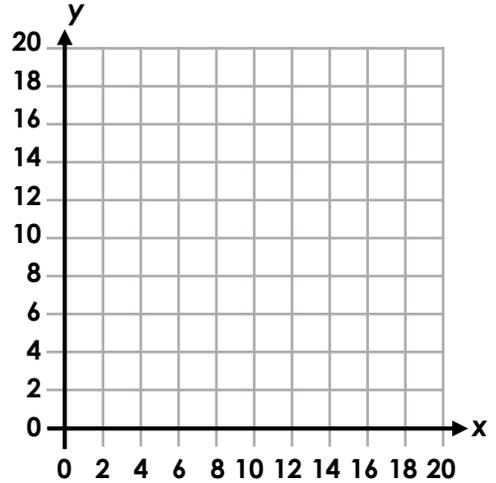


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## Position in the First Quadrant

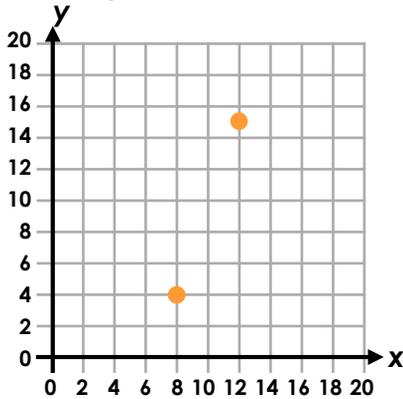
7b. The coordinates below will create a letter. Draw and join them on the grid to find out the letter.

(6, 2) (6, 18) (14, 2) (14, 18) (6, 11) (14, 11)



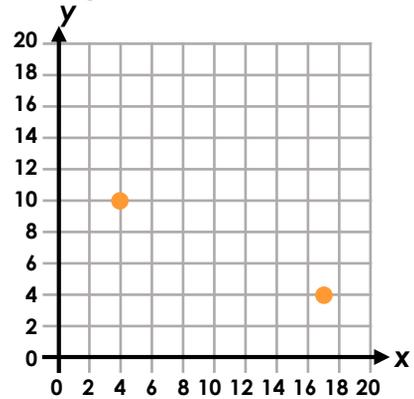
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8a. Two coordinates out of five have already been plotted. Write the rest of the coordinates and join them on the grid to create a pentagon.



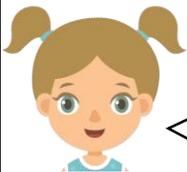
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8b. Two coordinates out of six have already been plotted. Write the rest of the coordinates and join them on the grid to create a hexagon.



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9a. True or false? Explain your answer.



The value of x and y **MUST** be an integer.

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9b. True or false? Explain your answer.



If your shape touches the top of the grid you cannot move it up any further.

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## Reasoning and Problem Solving Position in the First Quadrant

### Developing

- 1a. **O**
- 2a. **Accept any coordinates that would make a triangle with the given coordinates, for example: (4, 5) (4, 4) (2, 2)**
- 3a. **False, the coordinates make a straight vertical line which runs up and down, all the x values are the same so it is a straight line.**

### Expected

- 4a. **P**
- 5a. **Accept any coordinates that would make a quadrilateral with the given coordinates, for example: (1, 4) and (8, 4), (1, 8) and (8, 8)**
- 6a. **True. If you know 3 coordinates you know the direction of the square and can calculate which point is missing.**

### Greater Depth

- 7a. **M**
- 8a. **Accept any coordinates that would make a pentagon with the given coordinates, for example: (2, 10), (6, 14) and (14, 8)**
- 9a. **False. The values of the coordinates can be fractions and still be plotted, they will just be in the spaces between the lines if the grid shows only integers on the scales.**

## Reasoning and Problem Solving Position in the First Quadrant

### Developing

- 1b. **T**
- 2b. **Accept any coordinates that would make a triangle with the given coordinates, for example: (2, 1) (3, 2) (4, 3)**
- 3b. **True, the line is horizontal as all the y values are the same. Also (0,4) would be the next point on the left while (4,4) would be the next value on the right.**

### Expected

- 4b. **S**
- 5b. **Accept any coordinates that would make a quadrilateral with the given coordinates, for example: (6, 7) and (8, 7), (6, 1) and (8, 1)**
- 6b. **True. If the x value changes, the line will go horizontally. If the y value changes, it will go vertically.**

### Greater Depth

- 7b. **H**
- 8b. **Accept any coordinates that would make a hexagon with the given coordinates, for example: (6, 4), (16, 16), (6, 16) and (20, 10)**
- 9b. **False. The shape can move off the grid as you could draw more squares to make a bigger grid. If you know the scale on the x axis and the y axis, you can work out the new coordinates without drawing more of the grid.**