

# Reasoning and Problem Solving

## Step 1: Describe Position

### National Curriculum Objectives:

Mathematics Year 4: (4P3a) [Describe positions on a 2-D grid as coordinates in the first quadrant.](#)

### Differentiation:

Questions 1, 4 and 7 (Problem Solving)

**Developing** Work out the value of  $x$  and  $y$  for a co-ordinate which matches given parameters. One possible answer.

**Expected** Work out the value of  $x$  and  $y$  for a co-ordinate which matches given parameters. Two possible answers.

**Greater Depth** Work out the value of  $x$  and  $y$  for a co-ordinate which matches given parameters. Three possible answers.

Questions 2, 5 and 8 (Reasoning)

**Developing** Identify and explain a single error from points plotted on a grid.

**Expected** Identify and explain two or three errors from a shape plotted on a grid.

**Greater Depth** Identify and explain two or three errors from a more complex shape plotted on a grid.

Questions 3, 6 and 9 (Problem Solving)

**Developing** Find the missing co-ordinates of a point to form a square or rectangle on an unmarked grid. Numbers along each axis to increase in intervals of 1.

**Expected** Find the missing co-ordinates of points to form a symmetrical shape on an unmarked grid. Numbers along each axis to increase in intervals of 2 or 5.

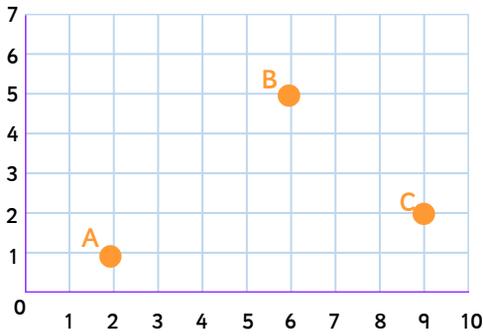
**Greater Depth** Find the missing co-ordinates of points to form an asymmetrical shape on an unmarked grid. Numbers along each axis to increase in intervals of 2 or 5.

[More resources](#) which follow the same small steps as White Rose.

Did you like this resource? Don't forget to [review](#) it on our website.

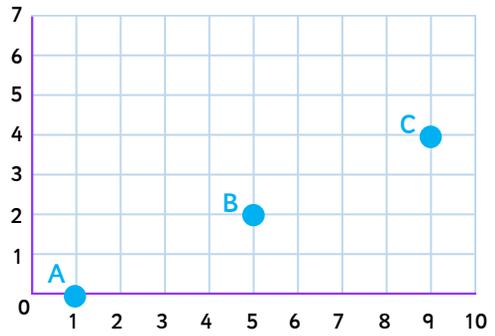
# Reasoning and Problem Solving – Describe Position

1a. In a given co-ordinate, the value of  $x$  is between 5 and 7 and the value of  $y$  is between 4 and 6. Which point on the grid is correct?



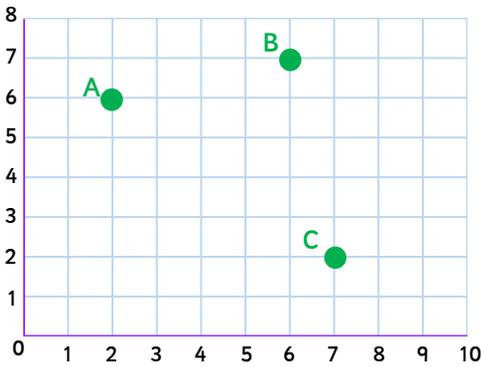
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1b. In a given co-ordinate, the value of  $x$  is between 8 and 10 and the value of  $y$  is between 3 and 5. Which point on the grid is correct?



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2a. Caleb has written the coordinates for the points on the grid. Explain any mistakes he has made.

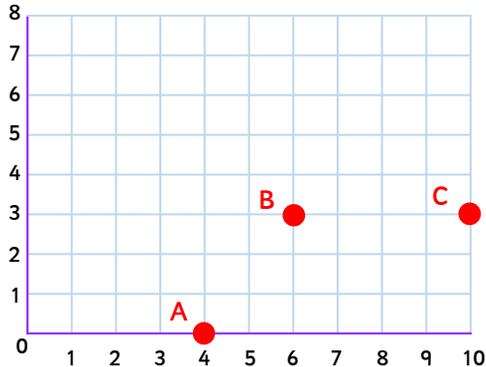


A = (2, 6)    B = (7, 6)    C = (7, 2)



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2b. Cara has written the coordinates for the points on the grid. Explain any mistakes she has made.

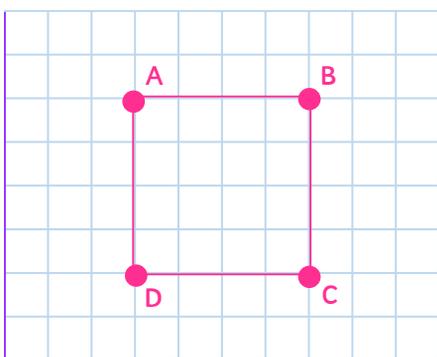


A = (4, 0)    B = (6, 3)    C = (3, 10)



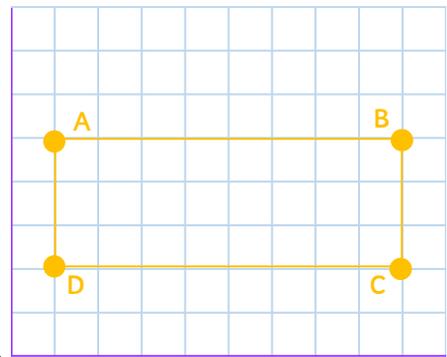
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3a. A = (3, 6)    C = (7, 2)  
Use this information to work out the co-ordinates of points B and D.



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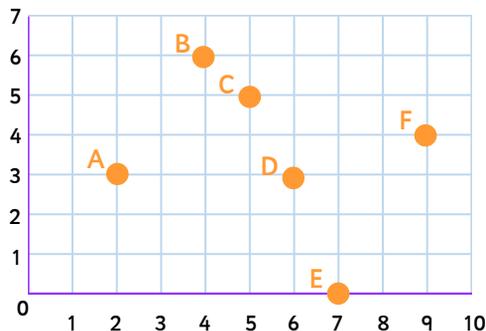
3b. B = (9, 5)    D = (1, 2)  
Use this information to work out the co-ordinates of points A and C.



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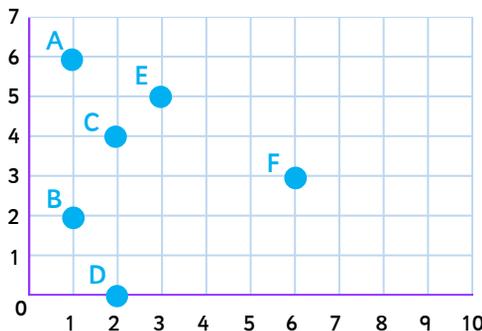
# Reasoning and Problem Solving – Describe Position

4a. In a given co-ordinate, the value of  $x$  is between 3 and 6 and the value of  $y$  is between 4 and 7. Which points on the grid could be correct?



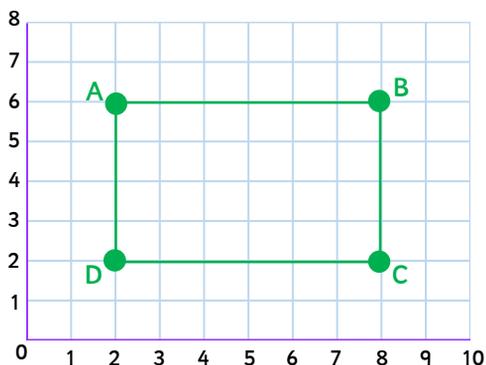
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4b. In a given co-ordinate, the value of  $x$  is between 2 and 4 and the value of  $y$  is between 3 and 6. Which points on the grid could be correct?



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5a. Brandon has written the coordinates for a rectangle. Explain any mistakes he has made.

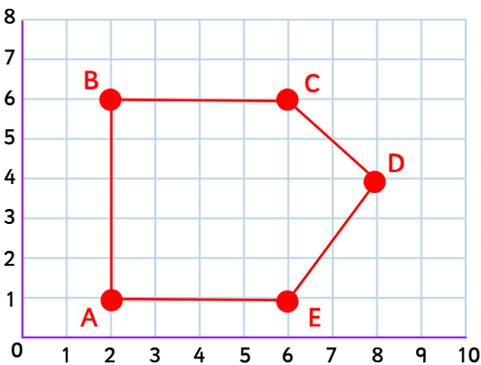


$A = (6, 2)$     $B = (6, 8)$     $C = (8, 6)$     $D = (2, 2)$



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5b. Susie has written the coordinates for a pentagon. Explain any mistakes she has made.

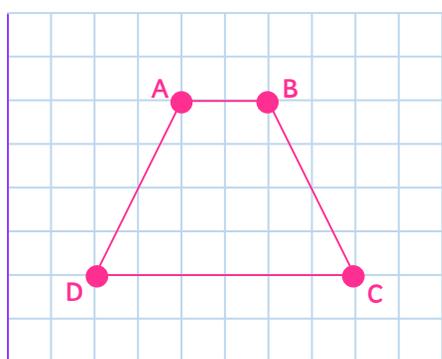


$A = (2, 1)$     $B = (6, 2)$     $C = (6, 6)$   
 $D = (8, 3)$     $E = (1, 6)$



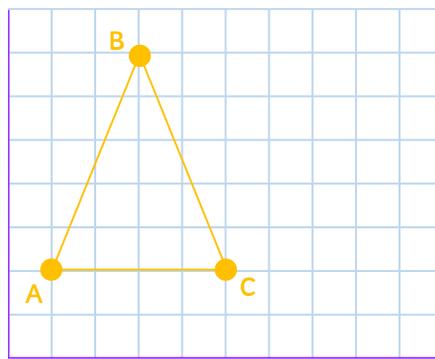
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6a.  $A = (8, 12)$     $C = (16, 4)$   
Use this information to work out the co-ordinates of points B and D.



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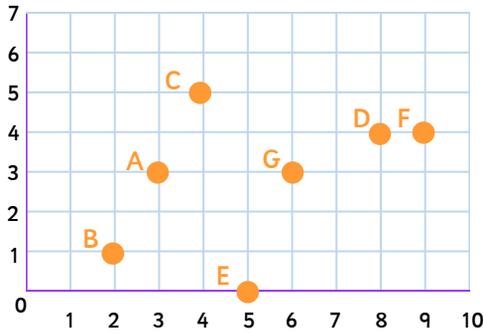
6b.  $A = (5, 10)$   
Use this information to work out the co-ordinates of points B and C.



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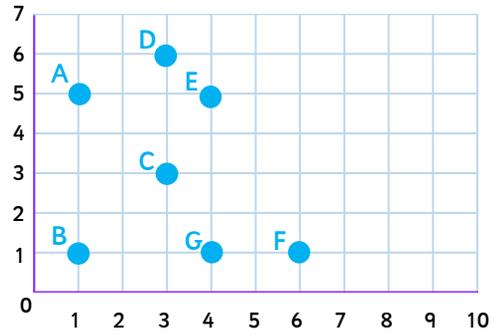
# Reasoning and Problem Solving – Describe Position

7a. In a given co-ordinate, the value of  $x$  is between 3 and 6 and the value of  $y$  is between 1 and 6. Which points on the grid could be correct?



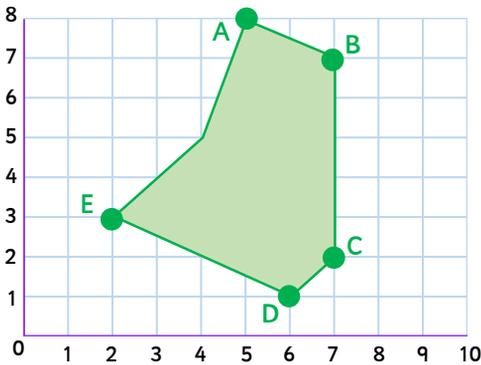
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7b. In a given co-ordinate, the value of  $x$  is between 0 and 5 and the value of  $y$  is between 4 and 7. Which points on the grid could be correct?



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8a. Sally has written the coordinates for a hexagon. Explain any mistakes she has made.

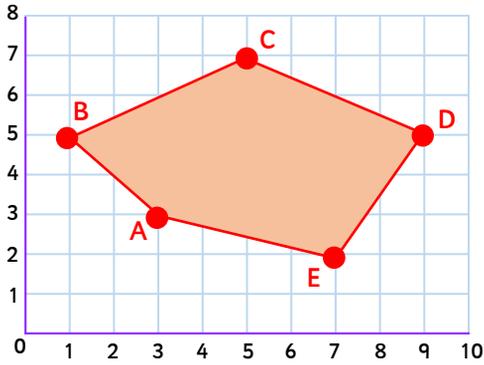


A = (5, 7)   B = (7, 7)   C = (2, 7)  
D = (1, 6)   E = (2, 3)   F = (4, 5)



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8b. Hashim has written the coordinates for a pentagon. Explain any mistakes he has made.

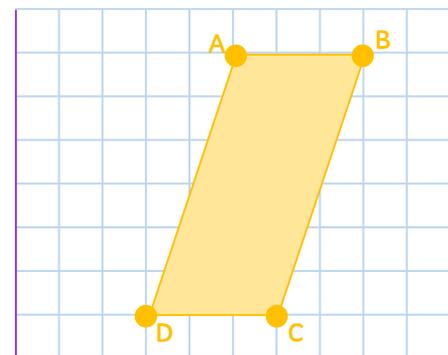


A = (3, 3)   B = (1, 5)   C = (7, 5)  
D = (9, 4)   E = (2, 7)



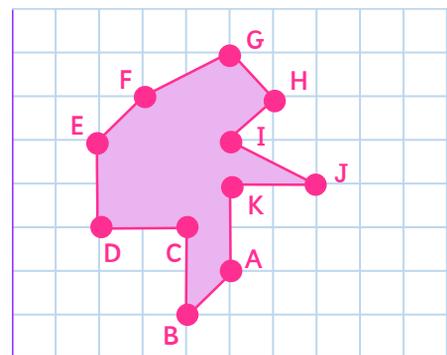
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9a. B = (40, 35)   D = (15, 5)  
Use this information to work out the coordinates of points A and C.



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9b. F = (6, 12)   K = (10, 8)  
Use this information to work out the coordinates remaining points.



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# Reasoning and Problem Solving – Describe Position

## Developing

- 1a. B is correct.
- 1b. C is correct.
- 2a. Caleb has read the  $y$  axis before the  $x$  axis on coordinate B, which should be (6, 7).
- 2b. Caleb has read the  $y$  axis before the  $x$  axis on coordinate C, which should be (10, 3).
- 3a. B = (7, 6) and D = (3, 2).
- 3b. A = (1, 5) and C = (9, 2).

## Expected

- 4a. B and C could be correct.
- 4b. C and E could be correct.
- 5a. Brandon has read the  $y$  axis before the  $x$  axis on coordinates A and B, which should be (2, 6) and (8, 6). He has misread coordinate C, as this should be (8, 2).
- 5b. Susie has read the  $y$  axis before the  $x$  axis on coordinates B and E, which should be (2, 6) and (6, 1). She has misread coordinate D, as this should be (8, 4).
- 6a. Grid increases in intervals of 2. Therefore B = (12, 12) and D = (4, 4).
- 6b. Grid increases in intervals of 5. B = (15, 35) and C = (25, 10).

## Greater Depth

- 7a. A, C and G could all be correct.
- 7b. A, D and E could all be correct.
- 8a. Sally has misread coordinate A, which should be (5, 8). She has read the  $y$  axis before the  $x$  axis on coordinates C and D, which should be (7, 2) and (6, 1).
- 8b. She has read the  $y$  axis before the  $x$  axis on coordinates C and E, which should be (5, 7) and (7, 2). She has misread coordinate D, which should be (9, 5).
- 9a. Grid increases in intervals of 5. A = (25, 35) and C = (30, 5).
- 9b. Grid increases in intervals of 2. A = (10, 4), B = (8, 2), C = (8, 6), D = (4, 6), E = (4, 10), G = (10, 14), H = (12, 12), I = (10, 10) and J = (14, 8).