

Exercise walk-through

C3.1

Coordinates

IGCSE Mathematics

You must be able to

- Read and plot ordered coordinate pairs
- Distinguish horizontal and vertical changes
- Use shared coordinates to complete axis-aligned shapes

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The method

Method — Key knowledge: Coordinates

In (x, y) , move horizontally by x then vertically by y . Positive x goes right; positive y goes up. The origin is $(0, 0)$. Points on the horizontal axis have $y = 0$; points on the vertical axis have $x = 0$. Use the axis scale, which need not be one per square.

Exercises 2.1·2.3

2.1 Plot $A = (2, 3)$ and $B = (-2, -1)$ on graph paper. [2]

2.2 A point is 4 left and 5 down from the origin. Give its coordinates. [2]

2.3 Give the point on the y -axis at height -3 and the point on the x -axis at 6. [2]

Exercises 2.1·2.3

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2.1

- **A: 2 right, 3 up; B: 2 left, 1 down** from the origin.
-

2.2 A point is 4 left and 5 down from the origin. Give its coordinates. [2]

2.2

- Left and down are negative: $(-4, -5)$.
-

2.3 Give the point on the y -axis at height -3 and the point on the x -axis at 6. [2]

2.3

- Zero horizontal coordinate on y -axis: $(0, -3)$. Zero vertical coordinate on x -axis: $(6, 0)$.

Exercise 2.4

2.4 An axis-aligned rectangle has consecutive vertices $(0, 2)$, $(4, 2)$, $(4, 7)$. Find its fourth vertex. [2]

3 Exam-style questions

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3 Exam-style questions

2.4

- Match the first x and third y : $(0, 7)$.

Exercise 3.1 (a)

3.1 Apply the coordinates methods below. Show working and include units where appropriate.

(a) Plot $P = (-3, -2)$, $Q = (2, -2)$, $R = (2, 4)$.

[2]

Exercise 3.1 (a)

3.1 Apply the coordinates methods below. Show working and include units where appropriate.

(a) Plot $P = (-3, -2)$, $Q = (2, -2)$, $R = (2, 4)$. [2]

(a)

- **P: left 3 down 2; Q: right 2 down 2; R: right 2 up 4.**

Exercise 3.1 (b)

3.1 Apply the coordinates methods below. Show working and include units where appropriate.

(b) Find S so that $PQRS$ is an axis-aligned rectangle with vertices in order. [2]

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(b)

- Vertical through P and horizontal through R meet at $S = (-3, 4)$.

Exercise 3.1 (c)

3.1 Apply the coordinates methods below. Show working and include units where appropriate.

(c) Write the coordinates of the point where the horizontal side RS crosses the y -axis.[2]

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(c)

- RS has $y = 4$; the y -axis has $x = 0$: $(0, 4)$.

Exercise 3.2 (a)

3.2 On graph paper plot $A = (-4, -1)$, $B = (2, -1)$ and $C = (2, 3)$. These are consecutive vertices of rectangle ABCD.

(a) Find D and give the horizontal and vertical side lengths by counting grid units. [3]

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(a)

- For D, keep A's x and C's y: $D = (-4, 3)$.
- Count **6 horizontal units** and **4 vertical units**.

Exercise 3.2 (b)

3.2 On graph paper plot $A = (-4, -1)$, $B = (2, -1)$ and $C = (2, 3)$. These are consecutive vertices of rectangle ABCD.

(b) Give the coordinates where side AB crosses the y-axis and side BC crosses the x-axis. Explain which coordinate must be zero at each crossing. [3]

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3.2 On graph paper plot $A = (-4, -1)$, $B = (2, -1)$ and $C = (2, 3)$. These are consecutive vertices of rectangle ABCD.

(b) Give the coordinates where side AB crosses the y-axis and side BC crosses the x-axis. Explain which coordinate must be zero at each crossing. [3]

(b)

- AB crosses at $(0, -1)$, because x is zero on the y-axis. BC crosses at $(2, 0)$, because y is zero on the x-axis.