

C3.1 Coordinates

Name: _____ Class: _____ Date: _____ **Total: 20 marks**

KEY WORDS coordinates 坐标 • horizontal 水平 • origin 原点 • vertical 竖直

Objective

Use coordinates to solve Core IGCSE Mathematics problems.

You must be able to:

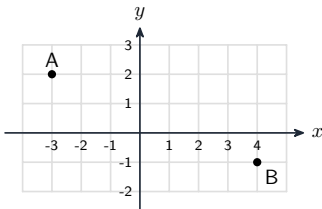
- Read and plot ordered coordinate pairs
- Distinguish horizontal and vertical changes
- Use shared coordinates to complete axis-aligned shapes

1 Key knowledge and worked examples

■ **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.

■ **Worked example: Coordinates**



Plot $A = (-3, 2)$: from the origin move 3 units left and 2 units up. Plot $B = (4, -1)$: 4 right and 1 down.

- For an axis-aligned rectangle with $P = (1, 1), Q = (5, 1), R = (5, 4)$, the fourth vertex is $S = (1, 4)$.
- P and S share their x value; R and S share their y value.

■ **Method check**

Write x first and y second. Points on a horizontal line share y ; points on a vertical line share x .

2 Practice

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]

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

3 Exam-style questions

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]

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

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

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]

(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]

Solutions

Award method and answer marks as indicated; accept equivalent correct methods.

2.1

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

2.2

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

2.3

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

2.4

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

3.1

(a)

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

(b)

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

(c)

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

3.2

(a)

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

(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.