

Name \_\_\_\_\_

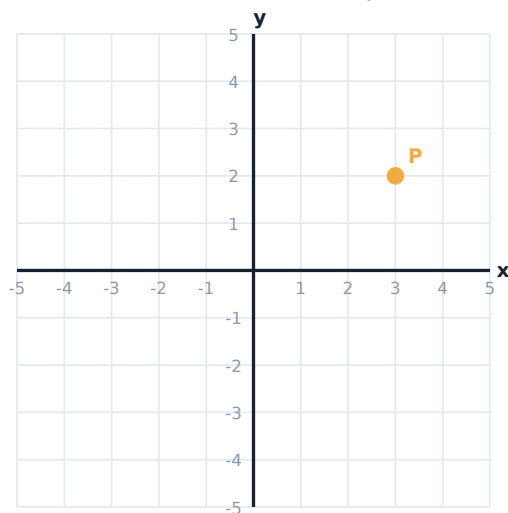
Date \_\_\_\_\_

## 11.1 Coordinates — worked answers

Read and plot coordinates in all four quadrants, and use them to describe positions, distances and midpoints. · 67 questions

### A · Fluency — Read points, name quadrants, measure gaps.

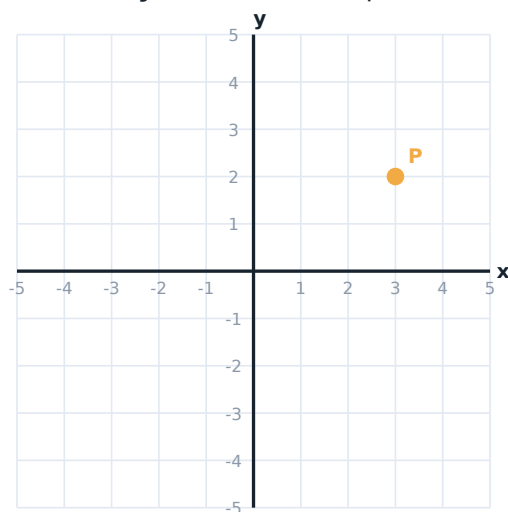
- 1 What is the **x-coordinate** of point P?



**Answer: 3**

P is at (3, 2). The x-coordinate is the first one, 3 — how far across.

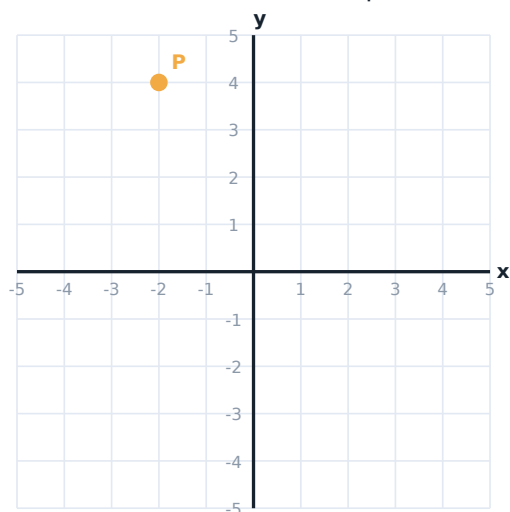
- 2 What is the **y-coordinate** of point P?



**Answer: 2**

The y-coordinate is the second one, 2 — how far up or down.

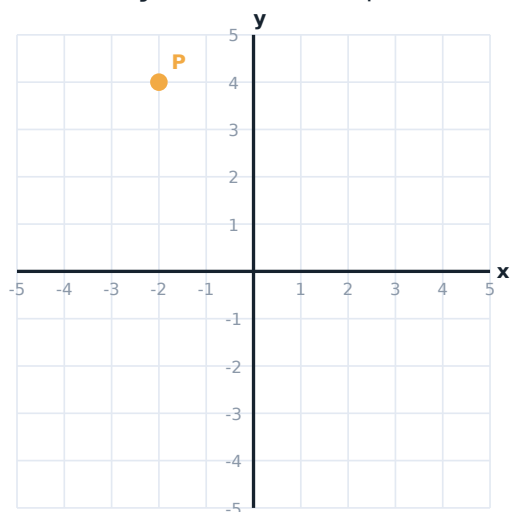
- 3 What is the **x-coordinate** of point P?



**Answer: -2**

P is at  $(-2, 4)$ . The x-coordinate is the first one,  $-2$  — how far across.

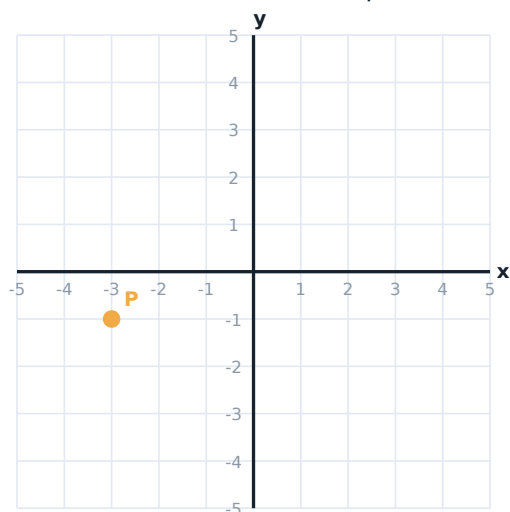
- 4 What is the **y-coordinate** of point P?



**Answer: 4**

The y-coordinate is the second one,  $4$  — how far up or down.

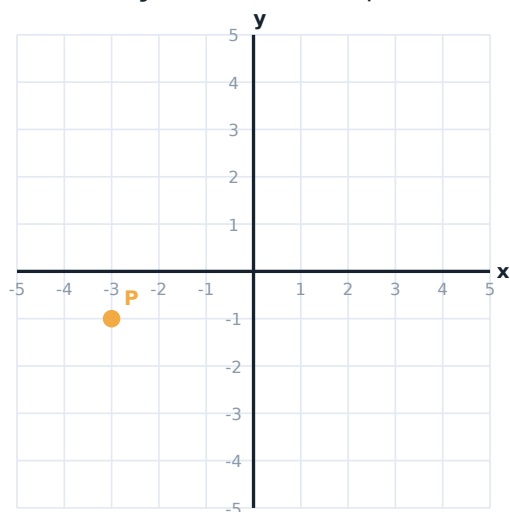
- 5 What is the **x-coordinate** of point P?



**Answer: -3**

P is at  $(-3, -1)$ . The x-coordinate is the first one,  $-3$  — how far across.

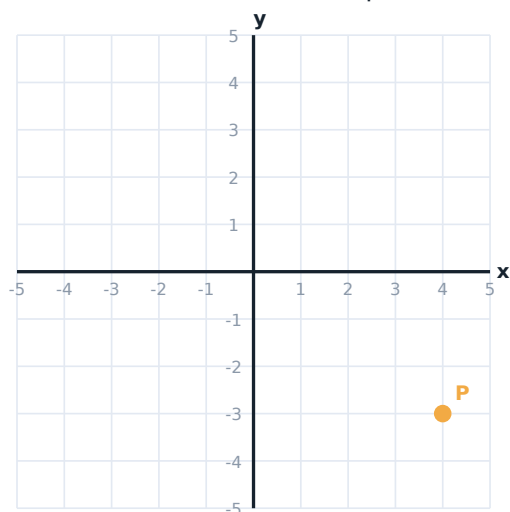
- 6 What is the **y-coordinate** of point P?



**Answer: -1**

The y-coordinate is the second one,  $-1$  — how far up or down.

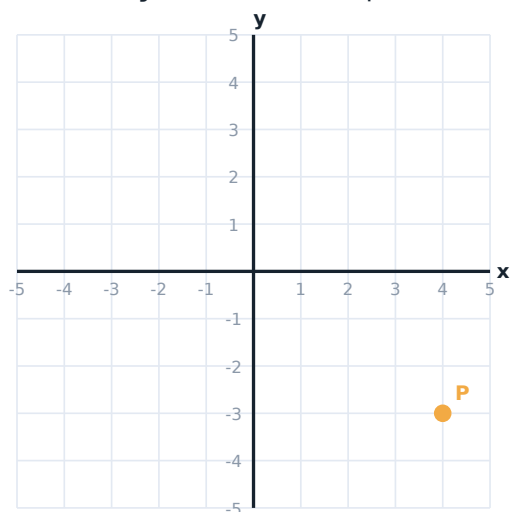
- 7 What is the **x-coordinate** of point P?



**Answer: 4**

P is at (4, -3). The x-coordinate is the first one, 4 — how far across.

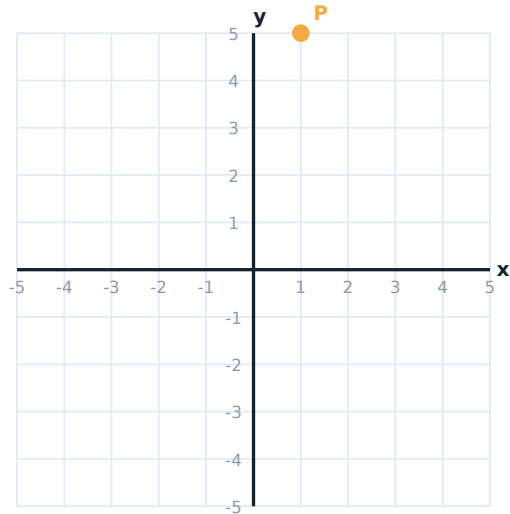
- 8 What is the **y-coordinate** of point P?



**Answer: -3**

The y-coordinate is the second one, -3 — how far up or down.

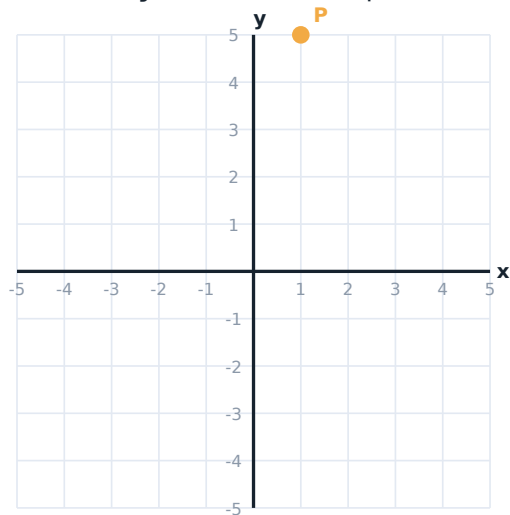
- 9 What is the **x-coordinate** of point P?



**Answer: 1**

P is at (1, 5). The x-coordinate is the first one, 1 — how far across.

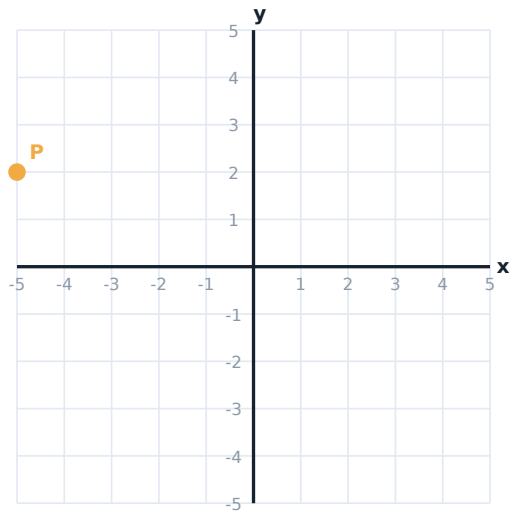
- 10 What is the **y-coordinate** of point P?



**Answer: 5**

The y-coordinate is the second one, 5 — how far up or down.

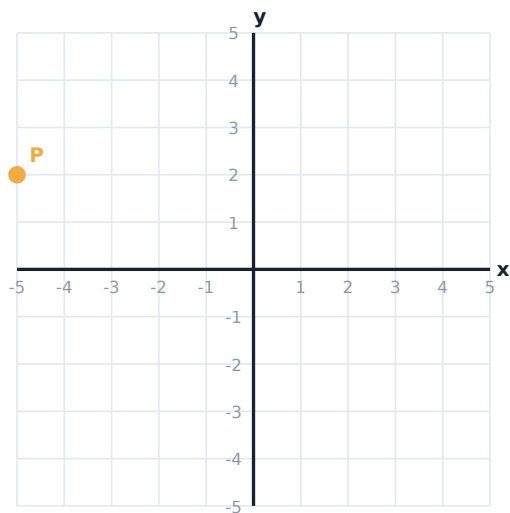
**11** What is the **x-coordinate** of point P?



**Answer: -5**

P is at  $(-5, 2)$ . The x-coordinate is the first one,  $-5$  — how far across.

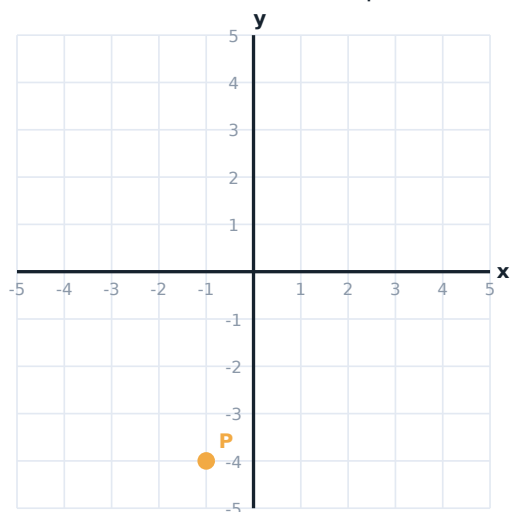
**12** What is the **y-coordinate** of point P?



**Answer: 2**

The y-coordinate is the second one,  $2$  — how far up or down.

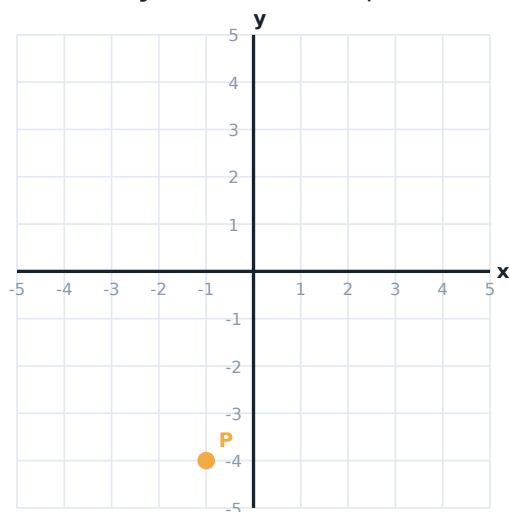
**13** What is the **x-coordinate** of point P?



**Answer: -1**

P is at  $(-1, -4)$ . The x-coordinate is the first one,  $-1$  — how far across.

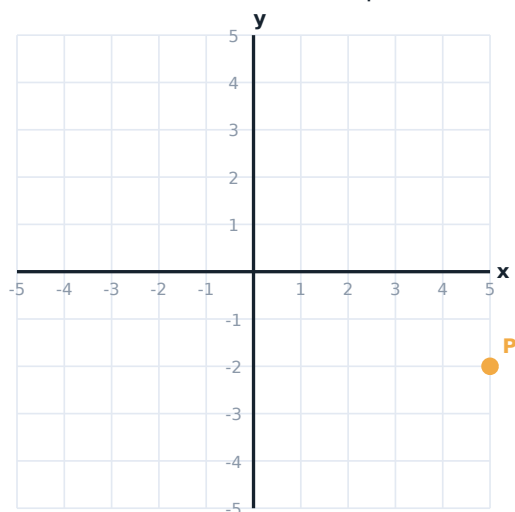
**14** What is the **y-coordinate** of point P?



**Answer: -4**

The y-coordinate is the second one,  $-4$  — how far up or down.

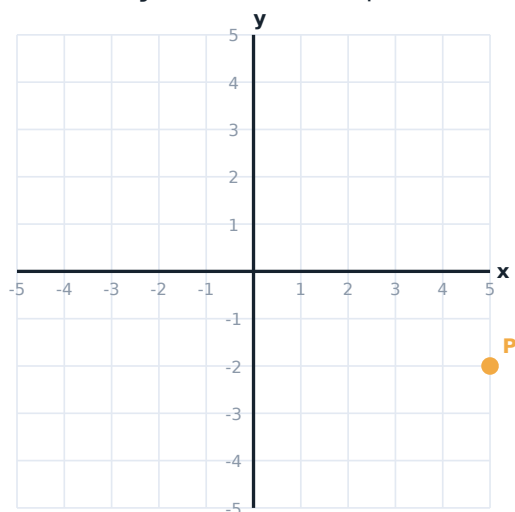
**15** What is the **x-coordinate** of point P?



**Answer: 5**

P is at (5, -2). The x-coordinate is the first one, 5 — how far across.

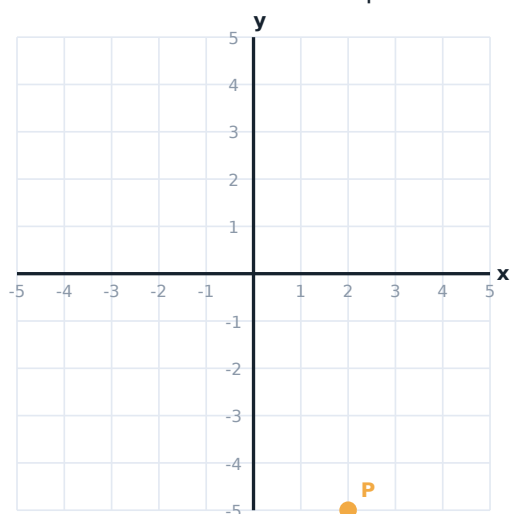
**16** What is the **y-coordinate** of point P?



**Answer: -2**

The y-coordinate is the second one, -2 — how far up or down.

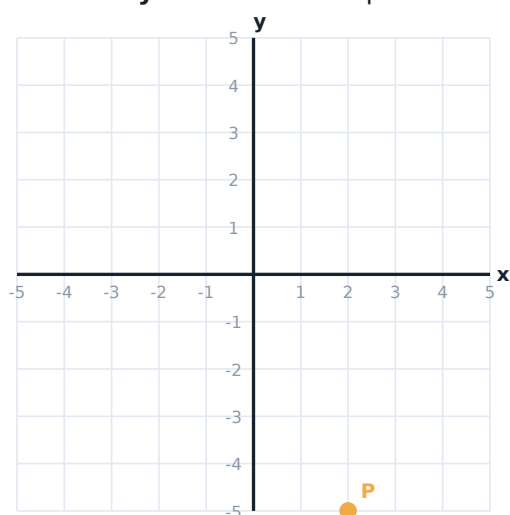
**17** What is the **x-coordinate** of point P?



**Answer: 2**

P is at (2, -5). The x-coordinate is the first one, 2 — how far across.

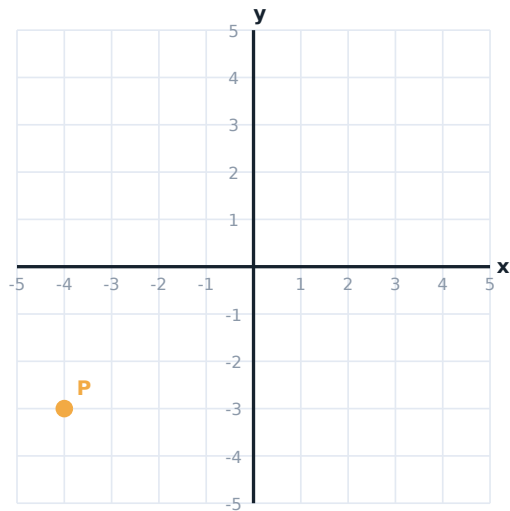
**18** What is the **y-coordinate** of point P?



**Answer: -5**

The y-coordinate is the second one, -5 — how far up or down.

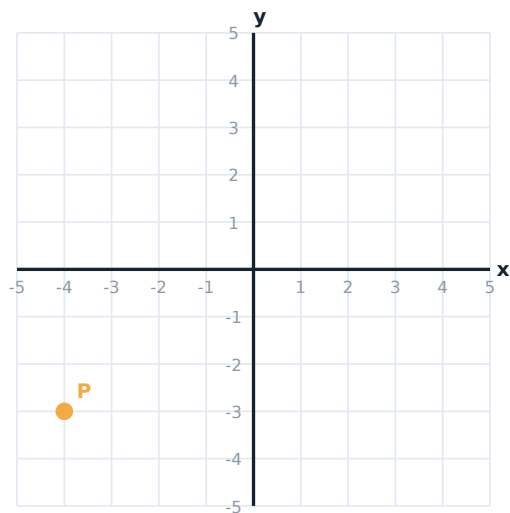
**19** What is the **x-coordinate** of point P?



**Answer: -4**

P is at  $(-4, -3)$ . The x-coordinate is the first one,  $-4$  — how far across.

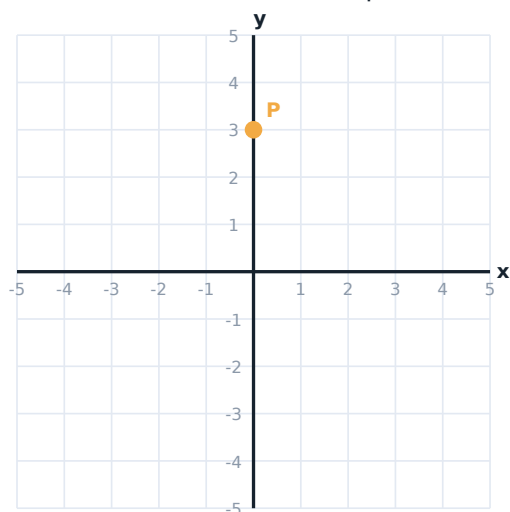
**20** What is the **y-coordinate** of point P?



**Answer: -3**

The y-coordinate is the second one,  $-3$  — how far up or down.

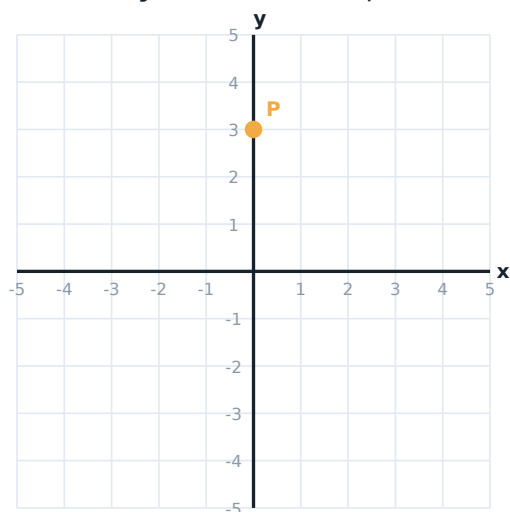
**21** What is the **x-coordinate** of point P?



**Answer: 0**

P is at (0, 3). The x-coordinate is the first one, 0 — how far across.

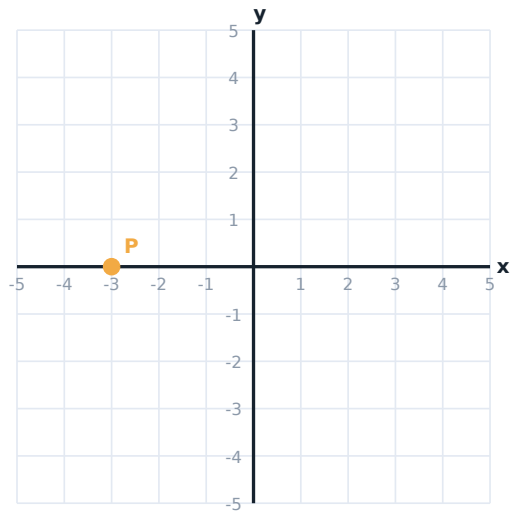
**22** What is the **y-coordinate** of point P?



**Answer: 3**

The y-coordinate is the second one, 3 — how far up or down.

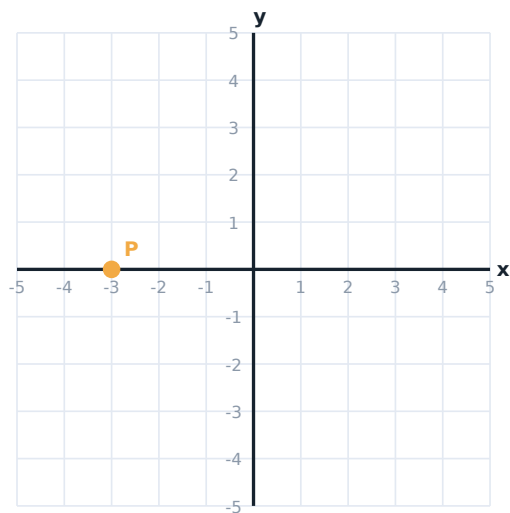
- 23 What is the **x-coordinate** of point P?



**Answer: -3**

P is at  $(-3, 0)$ . The x-coordinate is the first one,  $-3$  — how far across.

- 24 What is the **y-coordinate** of point P?



**Answer: 0**

The y-coordinate is the second one,  $0$  — how far up or down.

- 25 In which quadrant is the point  $(3, 2)$ ? Give the number.

**Answer: 1**

x is positive and y is positive, which is quadrant 1.

- 26 In which quadrant is the point  $(-2, 4)$ ? Give the number.

**Answer: 2**

x is negative and y is positive, which is quadrant 2.

- 27 In which quadrant is the point  $(-3, -1)$ ? Give the number.

**Answer: 3**

x is negative and y is negative, which is quadrant 3.

**28** In which quadrant is the point  $(4, -3)$ ? Give the number.

**Answer: 4**

x is positive and y is negative, which is quadrant 4.

**29** In which quadrant is the point  $(1, 5)$ ? Give the number.

**Answer: 1**

x is positive and y is positive, which is quadrant 1.

**30** In which quadrant is the point  $(-5, 2)$ ? Give the number.

**Answer: 2**

x is negative and y is positive, which is quadrant 2.

**31** In which quadrant is the point  $(-1, -4)$ ? Give the number.

**Answer: 3**

x is negative and y is negative, which is quadrant 3.

**32** In which quadrant is the point  $(5, -2)$ ? Give the number.

**Answer: 4**

x is positive and y is negative, which is quadrant 4.

**33** In which quadrant is the point  $(2, -5)$ ? Give the number.

**Answer: 4**

x is positive and y is negative, which is quadrant 4.

**34** In which quadrant is the point  $(-4, -3)$ ? Give the number.

**Answer: 3**

x is negative and y is negative, which is quadrant 3.

**35** How far apart are  $(1, 2)$  and  $(5, 2)$ ?

**Answer: 4**

They have the same y-coordinate, so the distance is the difference in x:  $5 - 1 = 4$ .

**36** How far apart are  $(-3, 4)$  and  $(2, 4)$ ?

**Answer: 5**

They have the same y-coordinate, so the distance is the difference in x:  $2 - -3 = 5$ .

**37** How far apart are  $(0, -1)$  and  $(6, -1)$ ?

**Answer: 6**

They have the same y-coordinate, so the distance is the difference in x:  $6 - 0 = 6$ .

**38** How far apart are  $(-4, -2)$  and  $(-1, -2)$ ?

**Answer: 3**

They have the same y-coordinate, so the distance is the difference in x:  $-1 - -4 = 3$ .

**39** How far apart are  $(2, 1)$  and  $(2, 5)$ ?

**Answer: 4**

They have the same x-coordinate, so the distance is the difference in y:  $5 - 1 = 4$ .

**40** How far apart are  $(-1, -3)$  and  $(-1, 2)$ ?

**Answer: 5**

They have the same x-coordinate, so the distance is the difference in y:  $2 - -3 = 5$ .

- 41** How far apart are  $(4, -4)$  and  $(4, 0)$ ?

**Answer: 4**

They have the same x-coordinate, so the distance is the difference in y:  $0 - -4 = 4$ .

- 42** What is the x-coordinate of the midpoint of  $(1, 1)$  and  $(5, 5)$ ?

**Answer: 3**

Average the x-coordinates:  $(1 + 5) \div 2 = 3$ .

- 43** What is the x-coordinate of the midpoint of  $(-4, 2)$  and  $(2, -4)$ ?

**Answer: -1**

Average the x-coordinates:  $(-4 + 2) \div 2 = -1$ .

- 44** What is the x-coordinate of the midpoint of  $(0, 0)$  and  $(6, 4)$ ?

**Answer: 3**

Average the x-coordinates:  $(0 + 6) \div 2 = 3$ .

- 45** What is the x-coordinate of the midpoint of  $(-3, -3)$  and  $(3, 3)$ ?

**Answer: 0**

Average the x-coordinates:  $(-3 + 3) \div 2 = 0$ .

### **B · Reasoning — Order, signs and what they mean.**

- 46** In the coordinate pair  $(3, -2)$ , which number comes first?

- ☐ The y-coordinate
- ☐ The x-coordinate
- ☐ Either
- ☐ The larger one

**Answer: The x-coordinate**

Always x then y — across the hall, then up the stairs.

- 47** Where is the origin?

- ☐ Top left
- ☐  $(0, 0)$ , where the axes cross
- ☐  $(1, 1)$
- ☐ Bottom right

**Answer:  $(0, 0)$ , where the axes cross**

Every coordinate is measured from there.

- 48** A point has a negative x and a positive y. Which quadrant?

- ☐ 1
- ☐ 2
- ☐ 3
- ☐ 4

**Answer: 2**

Quadrant 1 is top right, then they are numbered anticlockwise.

**49** A point has a positive  $x$  and a negative  $y$ . Which quadrant?

- ☐ 1
- ☐ 2
- ☐ 3
- ☐ 4

**Answer: 4**

Bottom right.

**50** Where does a point with  $x = 0$  lie?

- ☐ On the  $x$ -axis
- ☐ On the  $y$ -axis
- ☐ At the origin
- ☐ Nowhere

**Answer: On the  $y$ -axis**

$x = 0$  means no distance across, so the point sits on the vertical axis.

**51** Is  $(3, 5)$  the same point as  $(5, 3)$ ?

- ☐ Yes
- ☐ No

**Answer: No**

Order matters:  $(3, 5)$  is 3 across and 5 up;  $(5, 3)$  is 5 across and 3 up.

**52** Two points have the same  $y$ -coordinate. What can you say about the line joining them?

- ☐ It is vertical
- ☐ It is horizontal
- ☐ It is diagonal
- ☐ Nothing

**Answer: It is horizontal**

Neither point is higher than the other.

**53** How do you find the midpoint of two points?

- ☐ Add the coordinates
- ☐ Average the  $x$ -coordinates and average the  $y$ -coordinates
- ☐ Subtract them
- ☐ Multiply them

**Answer: Average the  $x$ -coordinates and average the  $y$ -coordinates**

The midpoint of  $(1, 1)$  and  $(5, 5)$  is  $(3, 3)$ .

### C · Challenge — Rectangles, midpoints and reflections.

**54** Three corners of a rectangle are  $(1, 1)$ ,  $(5, 1)$  and  $(5, 4)$ . What is the  $x$ -coordinate of the fourth corner?

**Answer: 1**

The fourth corner is  $(1, 4)$  — it shares an  $x$  with  $(1, 1)$  and a  $y$  with  $(5, 4)$ .

**55** Three corners of a rectangle are  $(1, 1)$ ,  $(5, 1)$  and  $(5, 4)$ . What is the  $y$ -coordinate of the fourth corner?

**Answer: 4**

The fourth corner is  $(1, 4)$ .

- 56** A rectangle has corners  $(-2, 1)$ ,  $(4, 1)$ ,  $(4, 5)$  and  $(-2, 5)$ . What is its width?

**Answer: 6**

$$4 - (-2) = 6.$$

- 57** A rectangle has corners  $(-2, 1)$ ,  $(4, 1)$ ,  $(4, 5)$  and  $(-2, 5)$ . What is its area?

**Answer: 24**

Width 6, height 4, so area 24.

- 58** The midpoint of  $(2, 3)$  and another point is  $(5, 7)$ . What is the x-coordinate of the other point?

**Answer: 8**

If the midpoint is 5 and one end is 2, the other is  $5 + 3 = 8$ .

- 59** A point is reflected in the y-axis. Its image is  $(-4, 3)$ . What was its x-coordinate?

**Answer: 4**

Reflecting in the y-axis changes the sign of x, so the original was  $(4, 3)$ .

#### D · Word problems — Maps, robots and plots of land.

- 60** On a map, a school is at  $(3, 4)$  and a shop at  $(3, 9)$ . How far apart are they, in grid squares?

**Answer: 5**

$$9 - 4 = 5.$$

- 61** A treasure map marks a chest 4 east and 2 south of the origin. What is its y-coordinate?

**Answer: -2**

South is negative.

- 62** A chess-style grid has a piece at  $(-3, -5)$ . Which quadrant is it in?

**Answer: 3**

Both coordinates negative: quadrant 3.

- 63** A robot starts at  $(0, 0)$ , moves 5 right and 3 up. What is its x-coordinate?

**Answer: 5**

Right is positive x.

- 64** A robot at  $(2, 6)$  moves 4 down. What is its new y-coordinate?

**Answer: 2**

$$6 - 4 = 2.$$

- 65** Two flags are at  $(-4, 2)$  and  $(6, 2)$ . How far apart are they?

**Answer: 10**

$$6 - (-4) = 10.$$

- 66** A garden plot has corners  $(0, 0)$ ,  $(8, 0)$ ,  $(8, 5)$ ,  $(0, 5)$ . What is its area, in square units?

**Answer: 40**

$$8 \times 5 = 40.$$

- 67** A point is 3 left and 7 down from the origin. What is its x-coordinate?

**Answer: -3**

Left is negative.