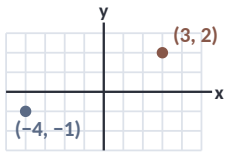
Straight line graphs: fact sheet

Planner week 4 · Learn these facts

Coordinates



(x, y): **across** first, then **up** or down

Along the corridor, up the stairs

Midpoints

P(−3, −2) and Q(2, 4)

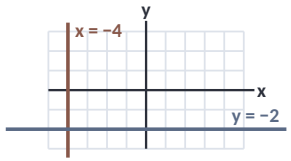
(−3 + 2) ÷ 2, (−2 + 4) ÷ 2

midpoint (−0.5, 1)

Add the xs and halve. Add the ys and halve

The middle of the two points

x = … and y = … lines



x = number: **vertical**. y = number: **horizontal**

y = −2 goes across

Table of values

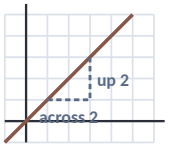
x	−1	0	1	2
y	−5	−2	1	4

y = 3x − 2: put each x in

Substitute each x to get y

Plot, then join with a ruler

Gradient



gradient
= up ÷ across
= 1

How steep: **up ÷ across**

Going down? Negative gradient

y = mx + c

y = 2x + 3

gradient 2 **crosses y at 3**

m is the gradient, c is where it crosses the y-axis

y = 3 − 4x: gradient −4

Parallel lines

y = 5x and y = 5x + 1

same gradient → parallel

rearrange to y = … first

Parallel lines have the **same gradient**

y = 2x + 1 and y = 2x − 4 are parallel

Drawing a graph

1. table of values for each x
2. plot the points carefully
3. join with a **ruler**, edge to edge
4. check: a straight line?

Which sheet do I need?

Coordinates and midpoints ▸
points and midpoints

Drawing straight line graphs ▸
a table of values, draw the line

Gradient and y = mx + c ▸
gradient, y-intercept, the equation

Key words

- **Coordinates** (x, y)
- **Gradient** steepness: up ÷ across
- **y-intercept** where the line crosses the y-axis
- **Midpoint** halfway between two points

Exam tips

- x first, then y: "along the corridor, up the stairs".
- Check the **scale** on each axis before you read or plot.
- Draw the whole line for the x values given, with a ruler.
- If your points aren't in a straight line, check your table.
- Gradient: pick two points on the line far apart.
- Gradient of a real-life graph = the **rate** (e.g. litres per second).

Coordinates and midpoints: fact sheet

Straight line graphs · Planner week 4 · Learn the method

Worked example

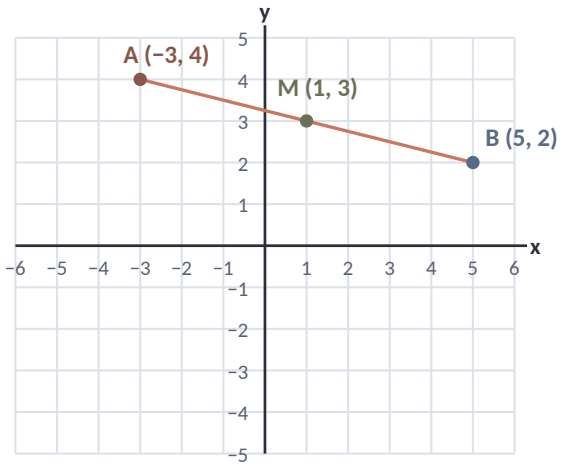
QUESTION

A is the point (−3, 4). B is the point (5, 2).

Find the coordinates of the midpoint of AB.

ANSWER

1. Add the x numbers and halve: (−3 + 5) ÷ 2 = 2 ÷ 2 = 1
2. Add the y numbers and halve: (4 + 2) ÷ 2 = 6 ÷ 2 = 3



(1, 3)

M is halfway between A and B.

How to do it

1. Read *x* first (across), then *y* (up or down).
2. Write coordinates in brackets with a comma: (−3, 4).
3. Midpoint: add the two *x*s and halve, add the two *y*s and halve.
4. $x = -4$ is a vertical line; $y = -3$ is a horizontal line.
5. Check: is your midpoint halfway on the grid?

Model answer:

(1, 3)

Watch out

- Writing (*y*, *x*) the wrong way round.
- Drawing $x = -4$ as a horizontal line.
- Adding the coordinates without halving.

Drawing straight line graphs: fact sheet

Straight line graphs · Planner week 4 · Learn the method

Worked example

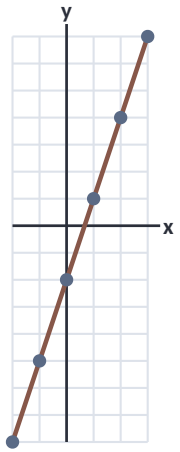
QUESTION

(a) Complete the table of values for $y = 3x - 2$. (b) Draw the graph of $y = 3x - 2$.

x	−2	−1	0	1	2	3
y						

ANSWER

1. Put each x into $3x - 2$. For $x = -2$: $3 \times -2 - 2 = -6 - 2 = -8$
2. y values: −8, −5, −2, 1, 4, 7
3. Plot each point, then join them with a ruler.



x	−2	−1	0	1	2	3
y	−8	−5	−2	1	4	7

Table of values, plot, then join with a ruler.

How to do it

1. Make a table with every x value in the range.
2. Substitute each x into the equation to find y.
3. Be careful with negatives: $3 \times -2 - 2 = -8$.
4. Plot every point accurately.
5. Join with a **single straight line** across the full range.

Points to plot:

A straight line through (0, −2) and (1, 1)

Watch out

- Only plotting two or three points.
- Mistakes with negative numbers.
- Joining dot to dot freehand.

Gradient and y = mx + c: fact sheet

Straight line graphs · Planner week 4 · Learn the method

Worked example

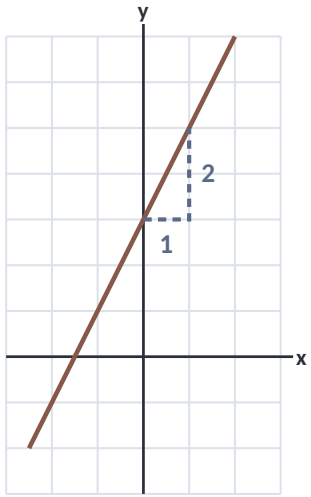
QUESTION

The graph shows a straight line.

Find the equation of the line. Give your answer in the form $y = mx + c$.

ANSWER

1. Where does the line cross the y-axis? At 3, so $c = 3$
2. Draw a triangle: the line goes up 2 for every 1 across
3. Gradient m = up ÷ across = 2 ÷ 1 = 2



$y = 2x + 3$

Gradient from the triangle, intercept from the y-axis.

How to do it

1. Find where the line crosses the y-axis: this is c.
2. Draw a triangle on the line: gradient = up ÷ across.
3. Lines going down from left to right have a **negative** gradient.
4. Write the equation as $y = mx + c$.
5. Parallel lines have the same gradient: rearrange to $y = \ldots$ to compare.

Model answer:

$y = 2x + 3$

Watch out

- Across ÷ up instead of up ÷ across.
- Missing the minus sign for a line going down.
- Reading c from the x-axis.