

Drawing linear graphs and gradient

About 50 minutes No calculator 40 marks



Hints online, answers free with an account:
mathswariz.uk/worksheets/gcse-drawing-linear-graphs-and-gradient/

Date _____

A Do Now

The first question is what today's lesson needs. The others bring back earlier topics.

- A1** Needed today [2 marks] Find the value of $-p^2 - pq$ when $p = -4$ and $q = -6$.
- A2** From chapter 8 [2 marks] Make x the subject of $y = 3\sqrt{x} - 1$.

Answer

Answer

- A3** Last lesson [2 marks] A cone has perpendicular height 15 cm and slant height 25 cm. Find its volume, in terms of π . ($V = \frac{1}{3}\pi r^2 h$)
- A4** Key Stage 3 [2 marks] Ali has £128. He spends $\frac{1}{8}$ of it on a coat and $\frac{1}{4}$ of what is left on shoes. How much money does he have left?

Answer

Answer

B Example, then your turn

Your teacher works through each example with you. Then try the one beside it.

EXAMPLE 1

Work out the gradient of the line through (1, 9) and (4, -3).

Hint Change in y divided by change in x .

- B1** [2 marks] Work out the gradient of the line through $(-3, -4)$ and $(1, 6)$.

Answer

EXAMPLE 2

The line $5x + 2y = 20$ crosses the x -axis at A and the y -axis at B . Find A and B , then work out the gradient of the line.

Hint On the x -axis $y = 0$; on the y -axis $x = 0$.

- B2** [3 marks] The line $2x + 3y = 18$ crosses the x -axis at A and the y -axis at B . Find A and B , then work out the gradient of the line.

Answer $A(\dots, \dots)$ $B(\dots, \dots)$ gradient

C Practice

- C1** Which two of these lines are parallel? [2 marks] **A:** $y = 3x - 7$ **B:** $2y = 6x - 5$ **C:** $y = 1 - 3x$ **D:** $3y = x + 6$. Give a reason.
- C2** Write down the gradient and the y -intercept of the line $4y = 6x + 12$. [2 marks]

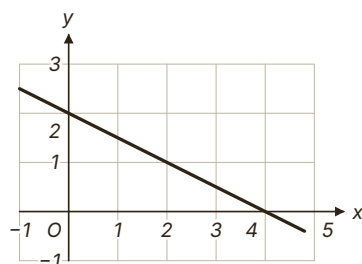
Answer gradient y -intercept

Answer ... and ...

- C3** A line has gradient -2 and crosses the y -axis at $(0, 7)$. Write down its equation, and find where it crosses the x -axis. [2 marks]
- C4** Does the point $(6, 13)$ lie on the line $y = 3x - 4$? Show how you decide. [2 marks]

Answer $y = \dots\dots$ ($\dots\dots, \dots\dots$)

- C5** The diagram shows a straight line. Work out its gradient and write down its y -intercept. [2 marks]
- C6** The points $A(-1, -4)$, $B(3, 8)$ and $C(5, k)$ lie on one straight line. Work out the value of k . [2 marks]



Answer

Answer gradient y -intercept

D Exam-style questions

- D1** Mia says, "The line through $(2, 1)$ and $(6, 9)$ goes 4 across and 8 up, so its gradient is $\frac{1}{2}$." [2 marks]
- Explain why Mia is wrong, and give the correct gradient.

- D2** Line L has equation $3x + 2y = 24$. It crosses the x -axis at P and the y -axis at Q . [2 marks]
- (a) Write down the coordinates of P and of Q .

Answer $P(\dots\dots, \dots\dots)$ $Q(\dots\dots, \dots\dots)$

(b) The point $(k, 18)$ lies on L . Work out the value of k .

[2 marks]

Answer

Total for D2: 4 marks

D3 This is a table of values for $y = 5 - 2x$.

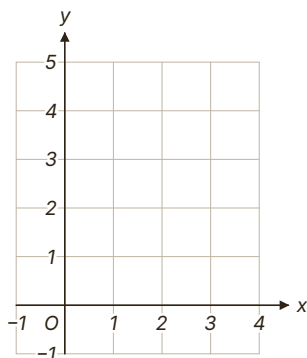
x	0	1	2	3
y	5		1	

(a) Complete the table.

[2 marks]

(b) On the grid, draw the graph of $y = 5 - 2x$ for values of x from 0 to 3.

[2 marks]



(c) Use your graph to find the value of x when $y = 0.5$.

[1 mark]

Answer

Total for D3: 5 marks

E Extension

No route is given. The hints are at the end of the sheet. Use one at a time.

E1 A straight line crosses the x -axis at $(4, 0)$. The triangle made by the line and the two axes has area 18. Work out the two possible gradients of the line. [4 marks]

Answer and

Extension hints

Cover these with paper. Uncover one at a time.

- E1** **Hint 1** Sketch it. The base is 4; the height is where the line crosses the y -axis.
- Hint 2** $\frac{1}{2} \times 4 \times h = 18$, so $h = 9$: it crosses at $(0, 9)$ or $(0, -9)$.
- Hint 3** From $(4, 0)$ to $(0, 9)$: $\frac{9}{-4} = -\frac{9}{4}$. From $(4, 0)$ to $(0, -9)$: $\frac{-9}{-4} = \frac{9}{4}$.

How did it go?

Colour one circle on each line: not yet, nearly, yes.

I can draw a straight line from a table of values, and work out a gradient from two points or from a graph.

☐ ☐ ☐

I can read the gradient and y -intercept from an equation, and write $y = mx + c$.

☐ ☐ ☐

I can find where a line crosses the axes by the cover-up method.

☐ ☐ ☐