



Graphs from equations in the form $ay \pm bx = c$

Year 8 About 70 minutes No calculator 48 marks

Date _____

A Do Now

Quick questions to start.

- A1** Needed today [1 mark]

Work out the value of $5y - 2x$ when $x = 3$ and $y = 4$.

A2 Needed today [1 mark]

Solve $-4x = 18$.

Answer

Answer

- A3** From chapter 10 [1 mark]

A cylinder has radius 3 cm and height 10 cm. Work out its volume. Leave your answer in terms of π .

A4 From chapter 9 [1 mark]

Write 0.00072 in standard form.

Answer

Answer

B Example, then your turn

Year 8

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

EXAMPLE 1

Find where the line $4y + 3x = 36$ crosses each axis.

Hint On the y -axis $x = 0$, so cover up the $3x$. On the x -axis $y = 0$, so cover up the $4y$.

- B1** Find where the line $5y + 3x = 30$ crosses each axis. [2 marks]

Answer (.....,.....) and (.....,.....)

EXAMPLE 2

Find where the line $3y - 2x = 18$ crosses each axis.

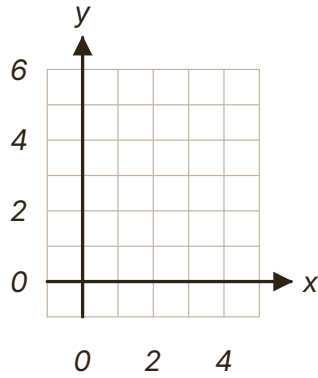
Hint Keep the minus sign with the $2x$: when $y = 0$ you solve $-2x = 18$.

- B2** Find where the line $2y - 5x = 20$ crosses each axis. [2 marks]

Answer (.....,.....) and (.....,.....)

EXAMPLE 3

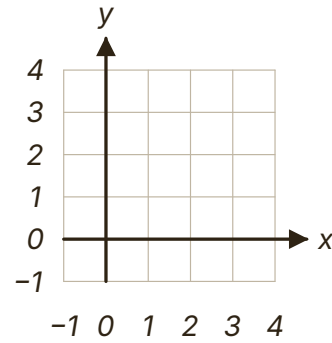
Draw the graph of $4y + 6x = 18$ on the grid.



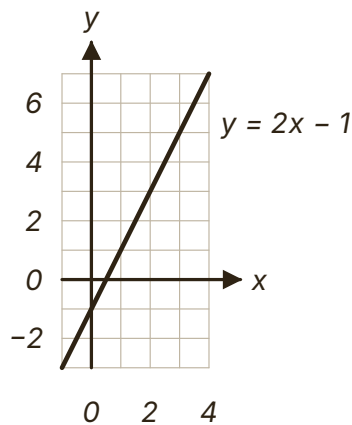
Hint $4y = 18$ gives $y = 4.5$: plot it halfway between 4 and 5.

B3 Draw the graph of $4y + 5x = 10$ on the grid.

[3 marks]

**EXAMPLE 4**

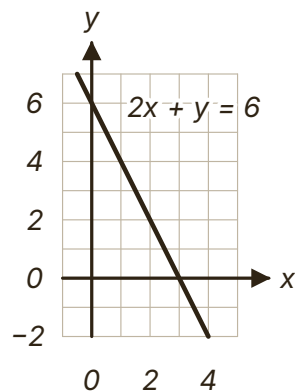
The graph of $y = 2x - 1$ is drawn. Use the graph to solve (a) $2x - 1 = 4$ (b) $2x - 1 = -2$



Hint Find 4 on the y -axis, go across to the line, then down to the x -axis.

B4 The graph of $2x + y = 6$ is drawn. Use the graph to solve (a) $6 - 2x = 3$ (b) $6 - 2x = -1$

[2 marks]



Answer (a) (b)

EXAMPLE 5

Rearrange $2y - 8x = 6$ into the form $y = mx + c$. Write down the gradient of the line.

Hint Add $8x$ to both sides, then divide every term by 2.

B5 Rearrange $4y - 2x = 12$ into the form $y = mx + c$. Write down the gradient of the line.

[2 marks]

Answer

C Practice

Year 8

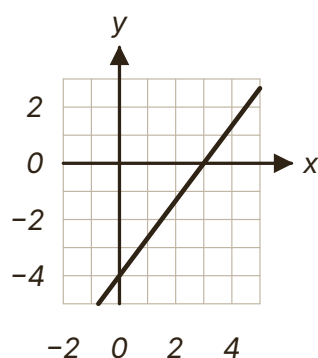
- C1** Which two of these lines are parallel? [2 marks]
A: $2y - 4x = 6$ B: $3y + 6x = 12$ C: $4y - 8x = 20$

Answer and

- C2** Which of the points $(2, 6)$, $(-2, 0)$ and $(4, 8)$ lie on the line $2y - 3x = 6$? [2 marks]

Answer

- C3** Which of these is the equation of the line on the grid? Give a reason. [2 marks]
A: $4x - 3y = 12$ B: $3x - 4y = 12$ C: $4x + 3y = 12$



- C4** A line crosses the axes at $(0, 5)$ and $(-2, 0)$. Write its equation in the form $ay - bx = c$, where a , b and c are whole numbers. [2 marks]

Answer

Answer

D Exam-style questions

GCSE Foundation

- D1** Leo says that the line $3y - 4x = 24$ crosses the x -axis at $(6, 0)$. [3 marks]

Leo is wrong. Explain his mistake, and write down where the line does cross the x -axis.

Answer (.....,.....)

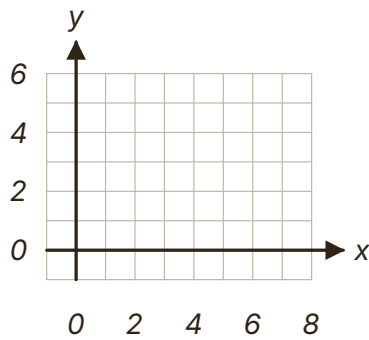
- D2** This question is about the line $3y + 2x = 15$.

- (a) Find where the line crosses each axis. [2 marks]

Answer (.....,.....) and (.....,.....)

(b) Draw the line on the grid.

[2 marks]



(c) Use your line to find the value of y when $x = 3$.

[1 mark]

Answer

Total for D2: 5 marks

D3 The graph of $2y - x = 4$ is drawn on the grid.

(a) Use the graph to find x when $y = 3.5$. [1 mark]

Answer

(b) Write down where the line crosses the x -axis. [1 mark]

Answer

(c) Rearrange $2y - x = 4$ into the form $y = mx + c$.

[2 marks]

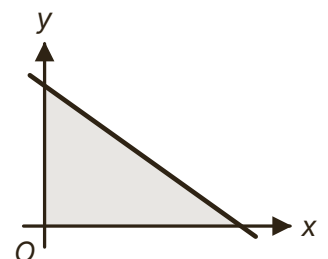
Answer

Total for D3: 4 marks

D4 The line $5y + 4x = 60$ and the two axes make a triangle. Work out the area of the triangle.

[4 marks]

Answer



Not drawn accurately

D5 Children's tickets for a show cost £4 and adult tickets cost £6. A group spends exactly £48. The number of children, x , and the number of adults, y , fit the equation $4x + 6y = 48$.

(a) Find where the graph of $4x + 6y = 48$ crosses each axis. [2 marks]

Answer (.....,.....) and (.....,.....)

(b) What does the point (12, 0) mean for the group? [1 mark]

(c) The group has 4 adults. How many children are in the group? [2 marks]

Answer

Total for D5: 5 marks

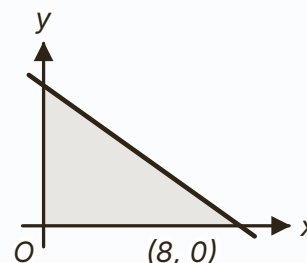
E Extension

Stretch

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

E1 The line $px + qy = 24$ crosses the x -axis at (8, 0). The line and the two axes make the shaded triangle, of area 24. Find p and q . [4 marks]

Answer $p = \dots\dots$ $q = \dots\dots$



Not drawn accurately

Extension hints

Cover these with paper. Uncover one at a time.

- E1** **Hint 1** At (8, 0), $y = 0$, so $8p = 24$.
Hint 2 The triangle's base is 8. Its height is where the line crosses the y -axis.
Hint 3 $\frac{1}{2} \times 8 \times h = 24$ gives $h = 6$, so $6q = 24$.

How did it go?

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

I can find where a line such as $3y - 2x = 18$ crosses each axis, and draw it. ☐ ☐ ☐

I can solve an equation by reading across from a graph. ☐ ☐ ☐

I can rearrange $ay \pm bx = c$ into $y = mx + c$ to find the gradient. ☐ ☐ ☐