

Real-life graphs and graphical solutions

About 40 minutes No calculator 33 marks



Hints online, answers free with an account:
mathswariz.uk/worksheets/gcse-real-life-graphs-and-graphical-solutions/

Date _____

A Do Now

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

A1 Needed today [2 marks] **A2** Last lesson [2 marks]

Find the coordinates of the point where the lines $y = 4x - 2$ and $y = x + 1$ cross.

Find the equation of the line through $(-4, 8)$ and $(-2, 6)$.

Answer

Answer

A3 From chapter 2 [2 marks] **A4** From chapter 6 [2 marks]

The cost of a ticket is decreased by 30%. The new amount is then increased by 15%. Find the overall percentage change.

Each interior angle of a regular polygon is 170° . Find the sum of its interior angles.

Answer

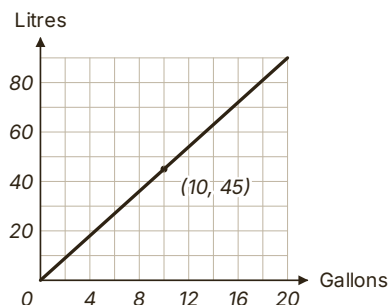
Answer

B Example, then your turn

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

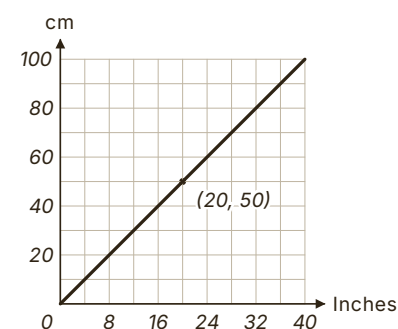
EXAMPLE 1

A straight-line graph changes gallons into litres. It passes through $(0, 0)$ and $(10, 45)$. Use it to change 18 gallons into litres.



Hint Work out how many litres one gallon is.

B1 A straight-line graph changes inches into centimetres. It passes through $(0, 0)$ and $(20, 50)$. Change 14 inches into cm, and 85 cm into inches. [2 marks]



Answer cm and inches

EXAMPLE 2

The lines $y = 3x - 4$ and $y = 11 - 2x$ are drawn on a grid. Work out where they cross.

Hint Where they cross, both y values are the same.

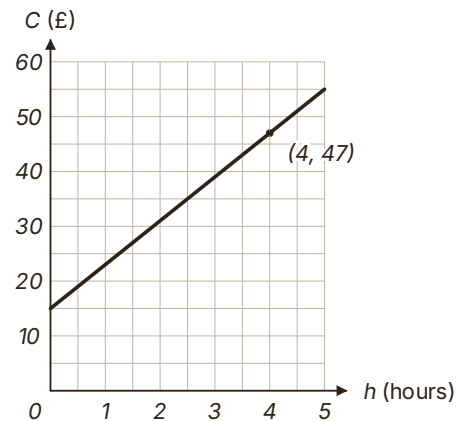
- B2** The lines $y = 4x + 1$ and $y = 2x + 9$ are drawn on a grid. Work out where they cross. [3 marks]

Answer (.....,)

c Practice

- C1** A mechanic charges a fixed fee of £48 plus £21 for each hour. Write a formula for the charge C pounds for h hours, and use it for a 4-hour job. [2 marks]
- C2** The graph of the cost of hiring a boat, £ C , against the time, h hours, is a straight line through $(0, 15)$ and $(4, 47)$. What does the 15 mean, and what is the cost per hour? [2 marks]

Answer $C = \dots\dots$ £ $\dots\dots$



- C3** Two lines cross at $(-2, 5)$. One of them is $y = 3x + 11$. The other has gradient -1 . Work out the equation of the other line. [2 marks]
- C4** Do the lines $y = 3x + 2$ and $y = 3x - 5$ cross? Give a reason. [1 mark]

Answer

D Exam-style questions

- D1** Ellie says, "The lines $y = 2x + 1$ and $y = 13 - x$ cross at $(3, 7)$, because $2 \times 3 + 1 = 7$." [3 marks]

Explain why Ellie is wrong, and find where the lines do cross.

D2 Swim club *A* charges £30 to join plus £4 for each session. Swim club *B* charges £6 for each session and nothing to join.

- (a) Write a formula for the cost C pounds of n sessions at each club. [2 marks]

Answer $A : C = \dots\dots\dots$ $B : C = \dots\dots\dots$

- (b) For how many sessions do the two clubs cost the same? [2 marks]

Answer

- (c) Maya plans 24 sessions. Which club is cheaper for her, and by how much? [2 marks]

Answer Club by £

Total for D2: 6 marks

E Extension

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

- E1** The lines $y = 2x + 3$ and $y = 11 - 2x$ and the x -axis make a triangle. Work out the area of the triangle. [4 marks]

Answer

Extension hints

Cover these with paper. Uncover one at a time.

- E1** **Hint 1** Find the three corners of the triangle.
Hint 2 $2x + 3 = 11 - 2x$ gives $(2, 7)$. The lines meet the x -axis at $x = -1.5$ and $x = 5.5$.
Hint 3 The base is $5.5 - (-1.5) = 7$ and the height is 7, so the area is $\frac{1}{2} \times 7 \times 7 = 24.5$.

How did it go?

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

I can read a conversion graph and say what a gradient means in a real context. ☐ ☐ ☒

I can write a cost formula and use it to compare two options. ☐ ☐ ☒

I can solve two equations together by finding where their lines cross. ☐ ☐ ☒