

Real-Life and Conversion Graphs

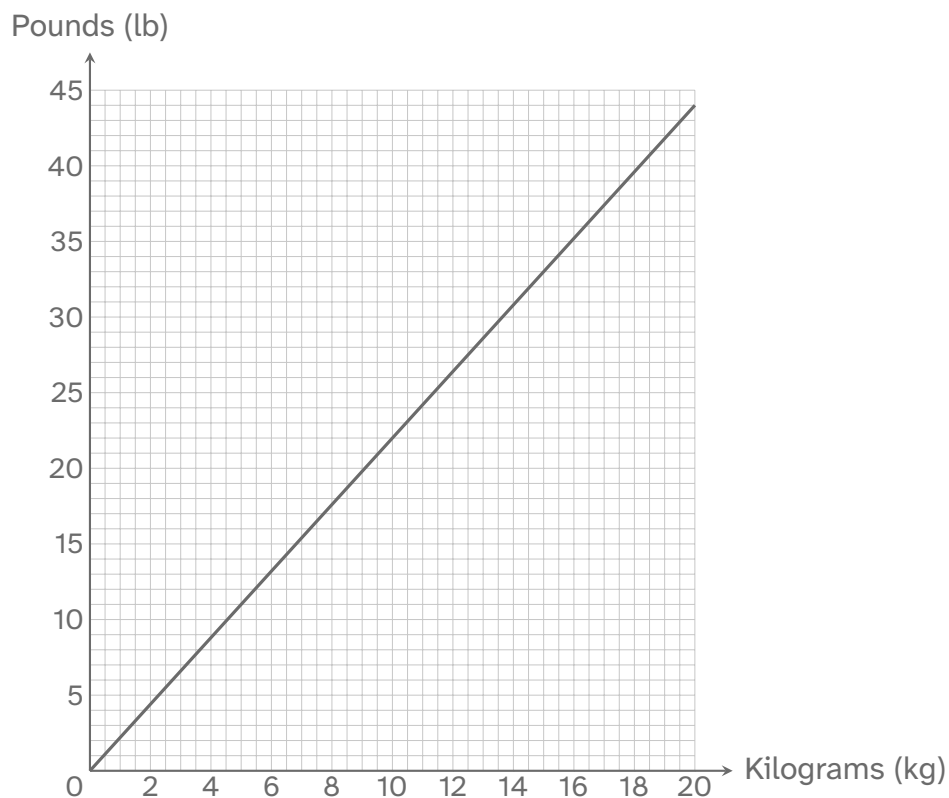
Solutions

For Pearson Edexcel GCSE Mathematics (1MA1) • Foundation tier

Each question is shown in grey, followed by the working, one step per line. The final answer is in a box. *Marks* shows how the marks are usually given in the exam, and **Tip** points out a common mistake.

1 (6 marks)

You can use this graph to change between kilograms (kg) and pounds (lb).



(a) Use the graph to change 15 kg to pounds.

Find 15 on the kilograms (horizontal) axis.

Go up to the line, then across to the pounds axis.

This reads 33 lb.

Answer: 33 lb

- (b) Use the graph to change 11 pounds to kilograms.

Find 11 on the pounds (vertical) axis.

Go across to the line, then down to the kilograms axis.

This reads 5 kg.

Answer: 5 kg

Tip: Check the scales before you read: on the kilograms axis each small square is 0.5 kg, but on the pounds axis each small square is 1 lb.

- (c) Jake's suitcase weighs 55 pounds.

The airline's weight limit for one suitcase is 23 kg.

Is Jake's suitcase over the weight limit?

You must show how you get your answer.

55 lb is off the graph, so use a reading from the graph and scale up.

From part (b), 11 lb = 5 kg.

$55 \div 11 = 5$, so $55 \text{ lb} = 5 \times 5 = 25 \text{ kg}$.

25 kg is more than 23 kg.

So yes, the suitcase is over the limit (by about 2 kg).

Answer: Yes, 55 lb is about 25 kg, which is more than 23 kg

Tip: 55 lb is off the graph. Split it into values you can read, e.g. $55 = 5 \times 11$, then scale up.

Marks: 1 mark for a correct method to change 55 lb to kg (or 23 kg to lb, about 50.6 lb). 1 mark for Yes with a correct comparison.

- (d) A school kitchen needs 12 pounds of potatoes.

Potatoes are sold in 2.5 kg bags.

How many bags of potatoes does the kitchen need to buy?

Change 12 lb to kilograms using the graph.

Go across from 12 on the pounds axis: about 5.5 kg.

$5.5 \div 2.5 = 2.2$

2 bags would only be 5 kg, which is not enough.

So the kitchen needs 3 bags.

Answer: 3 bags

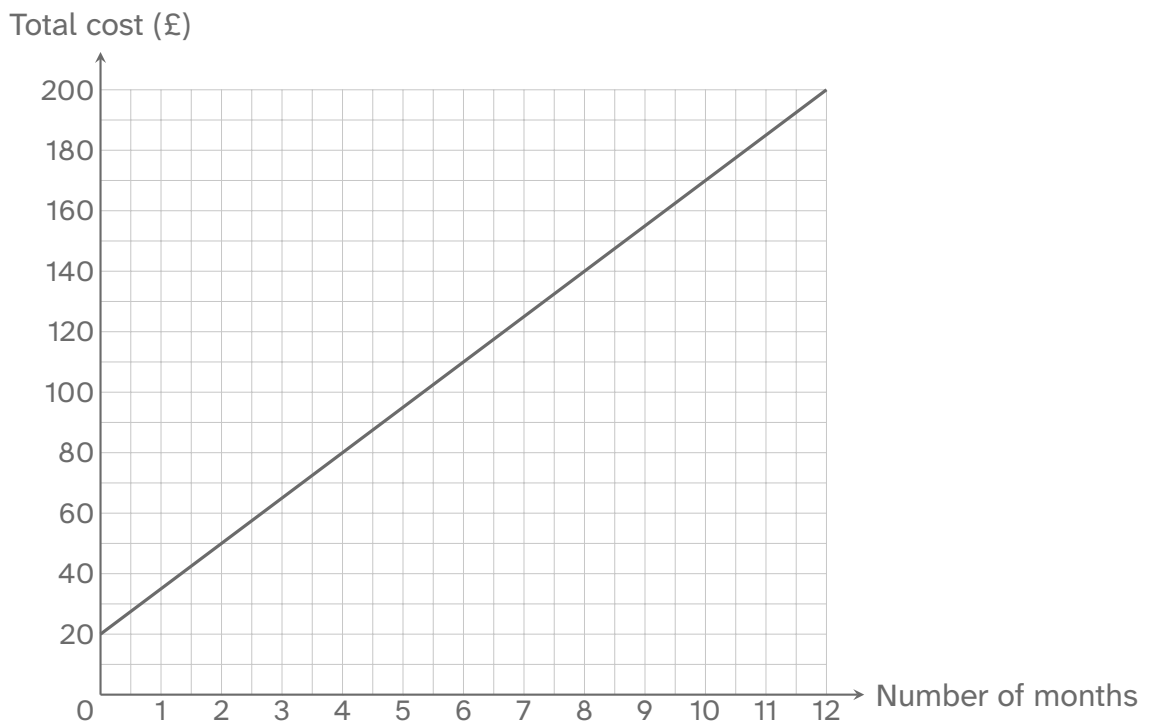
Tip: 2.2 bags is not possible. Round **up**, because 2 bags would not be enough potatoes.

Marks: 1 mark for changing 12 lb to kg (5.3 to 5.6) or 2.5 kg to lb (5.5). 1 mark for 3 bags.

2 (5 marks)

FitZone gym charges a joining fee and then a fee for each month.

The graph shows the total cost of being a member of FitZone for up to 12 months.



- (a) Use the graph to find the total cost of 6 months at FitZone.

Find 6 on the months axis.

Go up to the line, then across to the cost axis.

This reads £110.

Answer: £110

- (b) Work out the monthly fee at FitZone.

At 0 months the cost is £20, so the joining fee is £20.

For 12 months the total cost is £200.

So 12 monthly fees cost $200 - 20 = £180$.

Monthly fee: $180 \div 12 = £15$

Answer: £15

Tip: Take off the joining fee first. $200 \div 12$ gives the wrong answer because it includes the £20 joining fee.

Marks: 1 mark for $(200 - 20) \div 12$ or another correct method. 1 mark for £15.

- (c) PowerHouse gym charges £18 each month and has no joining fee.
Hana wants to be a member of a gym for 12 months.
Which gym is cheaper for Hana?
You must show how you get your answer.

FitZone for 12 months: £200 (from the graph)

PowerHouse for 12 months: $18 \times 12 = £216$

£200 is less than £216, so FitZone is cheaper.

Answer: FitZone (£200 compared with £216)

Marks: 1 mark for £216 (or both costs for the same number of months). 1 mark for FitZone with correct working.

3 (4 marks)

A company charges £12 plus £5 per hour to hire a canoe.

- (a) Complete the table.

Hours	0	2	5	8
Cost (£)	12	22	37	52

Cost = £12 + £5 for each hour.

0 hours: $12 + 5 \times 0 = 12$

2 hours: $12 + 5 \times 2 = 22$

5 hours: $12 + 5 \times 5 = 37$

8 hours: $12 + 5 \times 8 = 52$

Answer: 12, 22, 37, 52

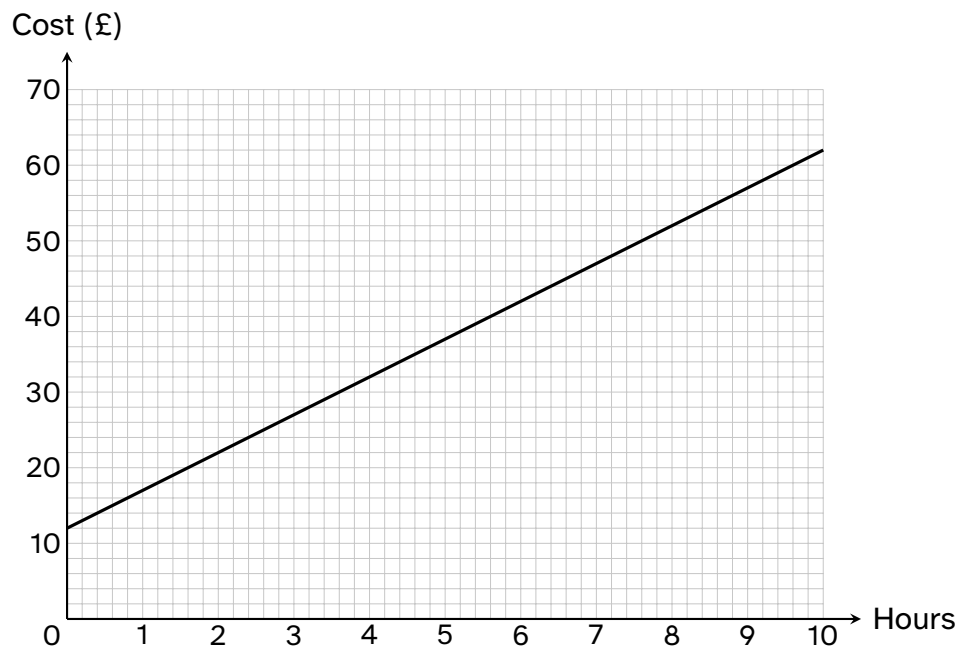
Tip: Don't forget the £12 you pay even for 0 hours. The graph does not start at (0, 0).

Marks: 2 marks for all four correct. 1 mark for two or three correct.

- (b) On the grid, draw a graph to show the cost of hiring a canoe for up to 10 hours.

Plot the points from the table: (0, 12), (2, 22), (5, 37), (8, 52).

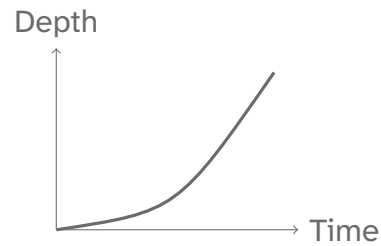
Join them with a ruler and continue the line to 10 hours, where the cost is £62.



Marks: 1 mark for plotting the points correctly. 1 mark for a straight line from (0, 12) to (10, 62).

4 (1 mark)

Here is a graph.



Explain why this graph could **not** show the depth of water in a bath being filled at a constant rate.

If water goes in at a constant rate, the depth goes up by the same amount every minute.

That would give a straight line.

This graph is curved, so the rate is not constant.

Answer: The graph is curved; a constant rate gives a straight line.

5 (4 marks)

The cost of hiring an electric scooter is an unlock fee plus a charge for each minute. This graph can be used to find the cost of a ride of up to 40 minutes.



- (a) Use the graph to find the cost of a 30-minute ride.

Find 30 on the time axis.

Go up to the line, then across to the cost axis.

This reads £7.

Answer: £7

- (b) Tom starts a ride at 08 47 and ends it at 09 12

Leah pays £5 for her ride.

Who had the longer ride?

You must show how you get your answer.

Tom: from 08 47 to 09 00 is 13 minutes, and from 09 00 to 09 12 is 12 minutes.

So Tom's ride is $13 + 12 = 25$ minutes.

Leah: find £5 on the cost axis, go across to the line, then down: 20 minutes.

25 minutes is longer than 20 minutes, so Tom had the longer ride.

(Or: a 25-minute ride costs £6 from the graph, which is more than Leah's £5.)

Answer: Tom (25 minutes compared with 20 minutes)

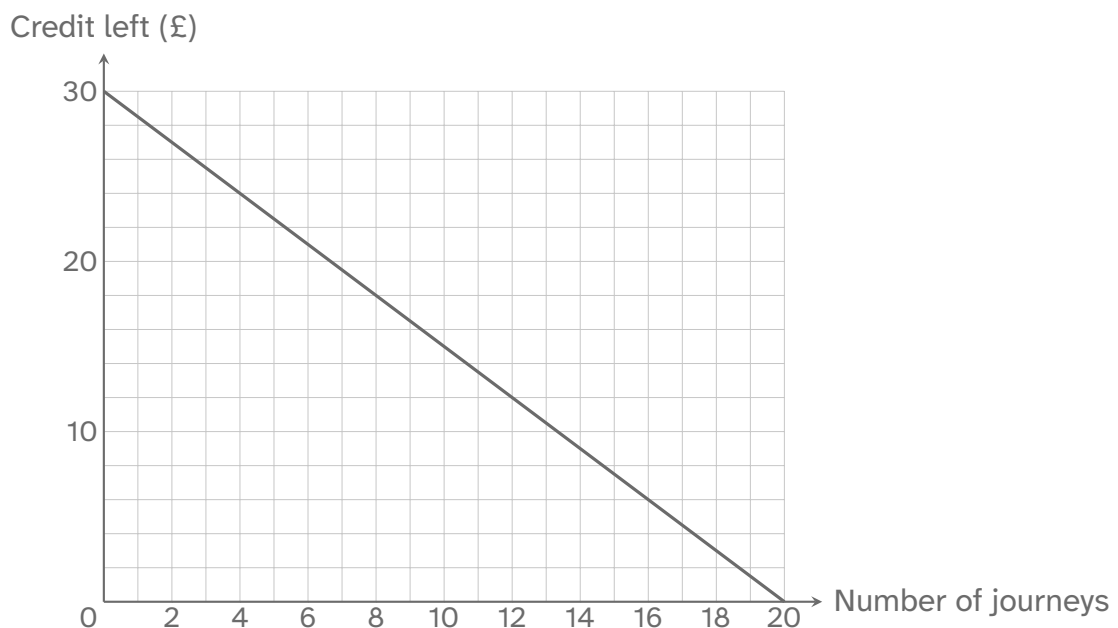
Tip: Time is not decimal. From 08 47 to 09 12 is 25 minutes, not $912 - 847 = 65$.

Marks: 1 mark for 25 minutes for Tom. 1 mark for 20 minutes for Leah (or £6 for Tom's ride). 1 mark for Tom with correct working.

6 (2 marks)

Sam puts some credit on his bus pass.

The graph shows the amount of credit left on the pass after each bus journey.



(a) What does the gradient of this graph represent?

The gradient is the change in credit divided by the change in the number of journeys.

The credit goes down by $30 \div 20 = £1.50$ for each journey.

So the gradient represents the cost of one bus journey.

Answer: The cost of each journey (£1.50 per journey)

Tip: Say what the gradient means in the context, with units: pounds per journey. “The line goes down” does not score.

- (b) How many journeys can Sam make before the credit runs out?

The credit runs out when it reaches £0.

The graph meets the horizontal axis at 20 journeys.

Answer: 20