Real-Life Graphs

GCSE Maths · Practice Questions

20 questions · 62 marks total

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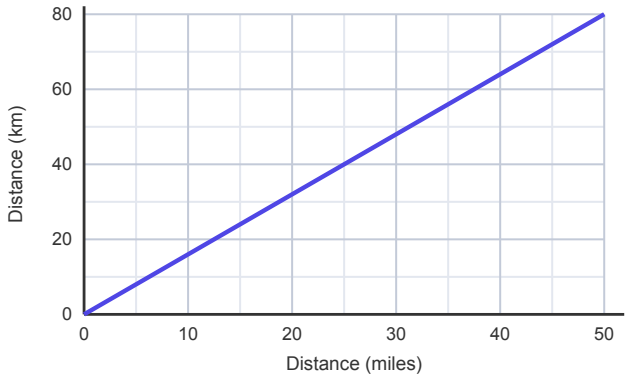
Section A · Foundation

Questions 1–3 are the most straightforward; they get harder as you go on. Question 10 is the most challenging.

1 **[1 mark]**

The conversion graph changes between miles and kilometres.



Use the graph to convert 20 miles into kilometres.

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2 **[2 marks]**

Use the same conversion graph to change 48 kilometres into miles.

.....

3 **[2 marks]**

The conversion line passes through (0, 0) and (50, 80).

(a) Work out the gradient of the line.

(b) What does the gradient tell you?

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4 **[2 marks]**

A plumber charges a £40 call-out fee plus £25 for each hour worked.

Write a formula for the cost, C pounds, of a job lasting h hours.

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5 [3 marks]

Using C = 25h + 40

(a) Work out the cost of a job lasting 3 hours.

(b) A job cost £165. How many hours did it take?

6 [3 marks]

A cyclist travels 24 km in 1 hour 30 minutes.

(a) Work out the average speed in km/h.

(b) At the same speed, how long would it take to travel 40 km?

7 [3 marks]

On a distance–time graph, describe what each of these tells you about the journey.

(a) A horizontal section.

(b) A steeper section.

(c) A section sloping back down to zero.

8 [3 marks]

The exchange rate is £1 = €1.15

(a) Change £250 into euros.

(b) Change €69 into pounds.

9 [4 marks]

Two gyms offer different deals.

Gym A: £30 per month plus £2 for each visit.

Gym B: £10 per month plus £6 for each visit.

(a) Write a formula for the monthly cost of each gym for v visits.

(b) For how many visits do the two gyms cost the same?

(c) Which gym is cheaper for someone who visits 8 times a month?

10 [4 marks]

A tank is filled with water at a constant rate.

After 2 minutes it holds 30 litres. After 5 minutes it holds 75 litres.

(a) Work out the rate of filling, in litres per minute.

(b) How much water was in the tank at the start?

(c) How long does it take to reach 200 litres?

Section B · Higher

Higher-tier style. Again, questions 1–3 are the gentlest and question 10 is the hardest.

1 [2 marks]

A car accelerates uniformly from rest to 24 m/s in 8 seconds.

Work out the acceleration.

2 [2 marks]

(a) What does the gradient represent on a distance–time graph?

(b) What does the area under the graph represent on a speed–time graph?

3 [3 marks]

A train travels at a constant 18 m/s for 25 seconds, then decelerates uniformly to rest over the next 12 seconds.

Work out the total distance travelled.

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4 [3 marks]

A driver covers 45 km at an average speed of 90 km/h, then 30 km at an average speed of 60 km/h.

Work out the average speed for the whole journey.

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5 [4 marks]

The speed of a car, in m/s, is recorded every 2 seconds.

Time (s)	0	2	4	6
Speed (m/s)	0	5	12	21

(a) Use three trapezia to estimate the distance travelled in the first 6 seconds.

(b) Is your answer an under-estimate or an over-estimate? Explain.

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6 [4 marks]

The depth of water, d cm, in a container is measured over time.

Time (min)	0	2	4	6
Depth (cm)	0	14	24	30

(a) Work out the average rate of increase between 2 and 4 minutes.

(b) Describe how the rate of filling changes, and suggest what this says about the shape of the container.

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7 **[4 marks]**

A cup of coffee cools so that its temperature T °C after t minutes is

$T = 20 + 60 \times 0.8^t$

(a) Work out the starting temperature.

(b) Work out the temperature after 5 minutes, to 1 decimal place.

(c) Explain what the number 20 represents.

8 **[4 marks]**

£2000 is invested at 5% compound interest per year.

(a) Work out the value after 10 years, to the nearest penny.

(b) A graph of value against time is drawn. Explain why it is a curve rather than a straight line.

9 **[4 marks]**

A car leaves home at 09:00, drives 90 km and arrives at 10:30. It stops for 30 minutes, then drives the 90 km home, arriving at 12:30.

(a) Work out the average speed on the outward journey.

(b) Work out the average speed on the return journey.

(c) Work out the average speed for the whole trip, including the stop, to 1 decimal place.

10 **[5 marks]**

A train accelerates uniformly from rest to V m/s in 20 seconds. It then travels at V m/s for 60 seconds, before decelerating uniformly to rest in a further 40 seconds.

The total distance travelled is 3600 m.

(a) Find the value of V.

(b) Work out the acceleration during the first stage.