Planner

Real-life graphs

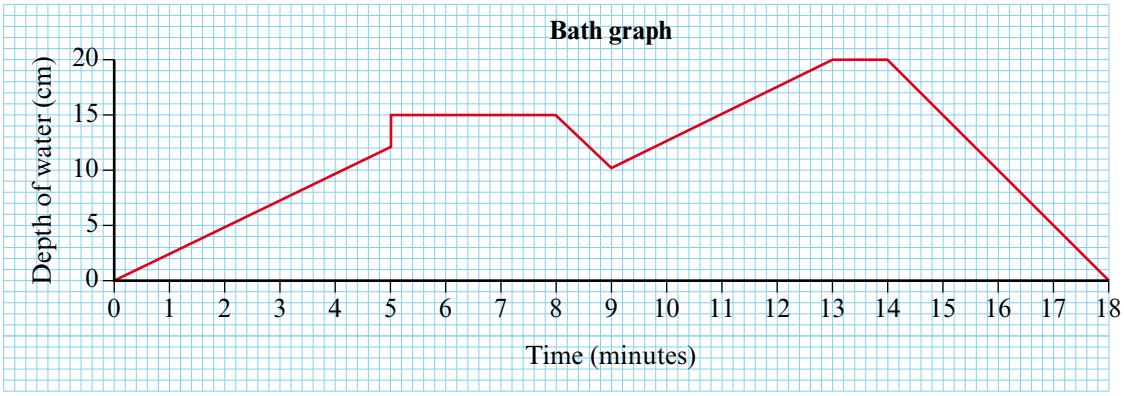
- Solving distance–time problems
- Finding linear equations for graphs of real situations
- Drawing graphs of linear functions
- Giving possible explanations for non-linear graphs

Keywords

You should know

explanation 1a | explanation 1b | explanation 1c

1 The graph shows the story of Baz's bath.



a What was the maximum depth of the water?

b At what speed did the bath fill with water?

c How could you explain the sudden increase in depth after 5 minutes?

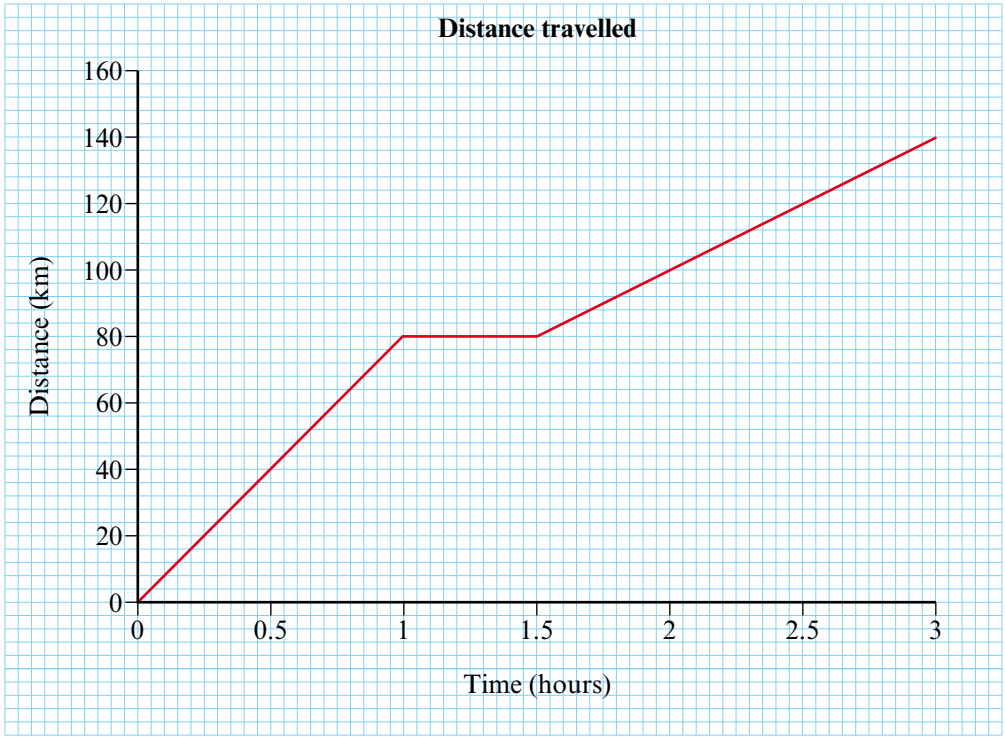
d What do you think happened between 5 and 9 minutes?

e How long did the bath take to empty at the end?

f At what speed did the depth of water decrease at the end?

g How would the graph change if Baz had jumped out to answer the phone after 13 minutes?

2 The distance–time graph shows Amy's journey by car.



a Use the graph to describe Amy's journey.

b How far did Amy travel altogether in 3 hours?

c What was Amy's speed in the first hour of the journey (in kilometres per hour)?

d What was her speed in the third stage of the journey?

e What was her average speed for the whole journey? Give your answer to 1 d.p.

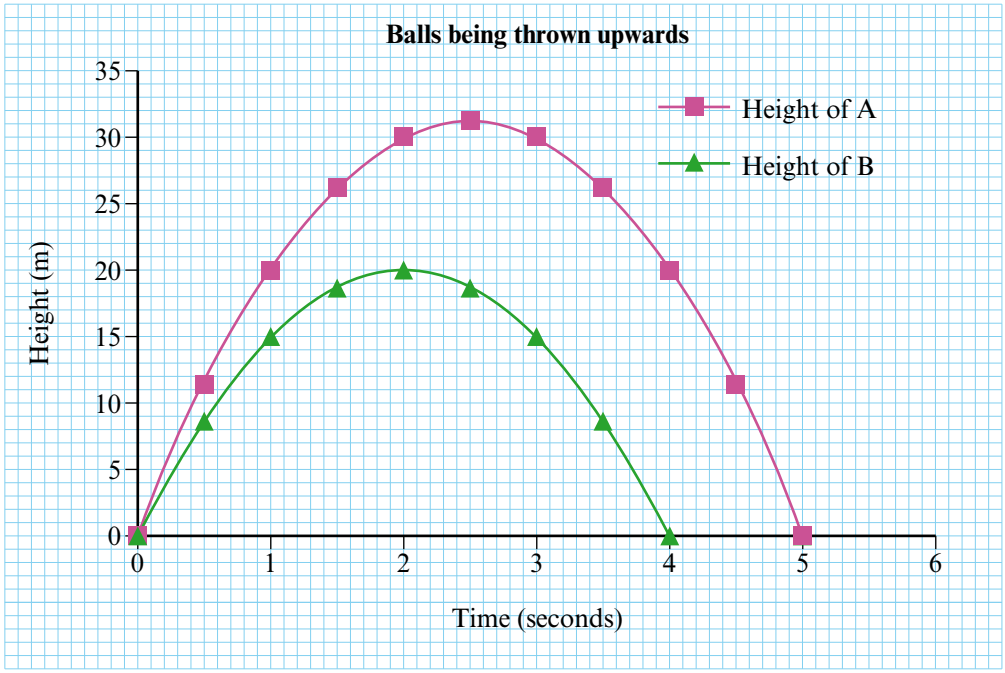
f For what fraction of her journey did she stop?

g Write an equation showing distance (d) in kilometres and time (t) in hours for the first stage of the journey.

h Write an equation showing distance (d) in kilometres and time (t) in hours for the third stage of the journey.

explanation 2a | explanation 2b | online

3 Two balls were thrown upwards at the same time.
The graph shows the heights of the balls at different times.



a Estimate the difference in the maximum height reached by the two balls.

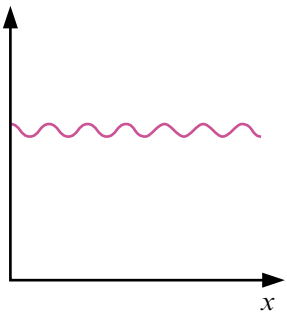
b How long did it take each ball to reach its maximum height?

c How many seconds after the balls were thrown was their difference in height approximately 10 m?

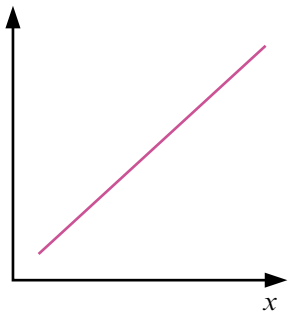
d How long did it take ball A to fall 20 m from its maximum height?

4 Match each graph to one of the descriptions below.
In each graph, the x-axis shows time.

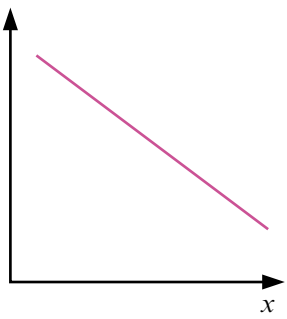
i



ii



iii



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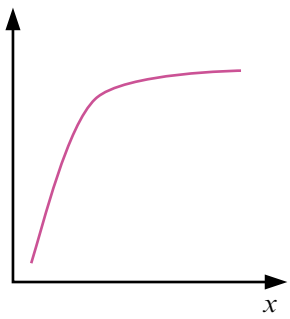

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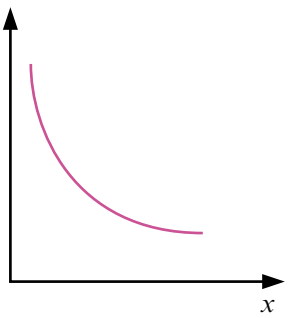
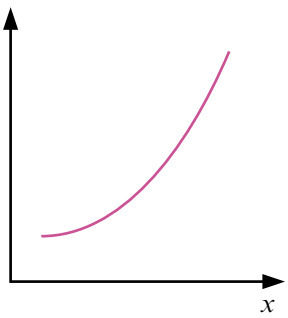


vi



a The distance from a post of someone who is running away from the post but who is attached to the post by a bungee rope.

b The amount of compound interest earned on an investment of £100.

c The cost of a telephone call.

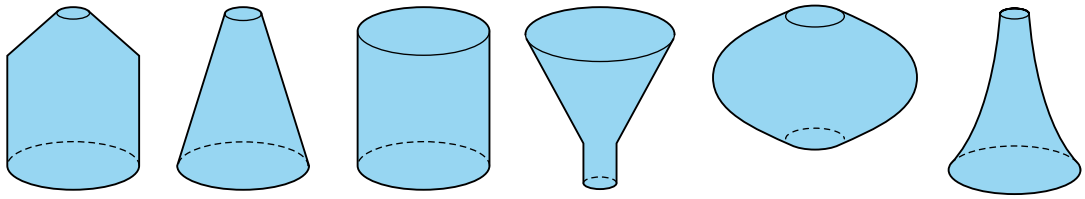
d The temperature in a room heated by a thermostatically controlled radiator.

e The number of children left in a school hall when everyone is leaving after assembly.

f The speed of a car coming off a motorway onto a slip road.

5 Water was poured at a constant speed into different containers. For each container, sketch a graph showing the depth of water against time.

a **b** **c** **d** **e** **f**



6 For each of these equations, sketch a graph showing the linear relationship between the two variables.

a When n = number of tables, the number of people (p) is given by the equation $p = 4n$.

b When t = time in hours, the distance travelled (s kilometres) is represented by the equation $s = 40t$.

c The exchange rate from US dollars to pounds sterling is given by $p = \frac{2d}{3}$, where p is the number of pounds and d is the number of dollars.

d For a storage tank being filled with water, the volume of water, V (in litres), is related to the time taken, t (in minutes), by the equation $V = 5t + 15$.

7 Which of the graphs you drew for question **6** does *not* pass through the origin? Why not?

8 For each of these, write an equation linking two variables.
Sketch a graph to show the relationship between the variables.
State what your variables are in each case.

a A car uses fuel at the rate of 1 litre for every 10 kilometres. It starts its journey with a full tank of 50 litres and ends the journey with the tank empty.

b The temperature of a pan of water increases at the rate of 8 °C per minute.

c The number of members of a football club remains constant from year to year.