Skills practice B

Reasoning

1 Each of these situations can be represented by a graph.

a Match the situations **i** to **v** with the graphs **A** to **E**.

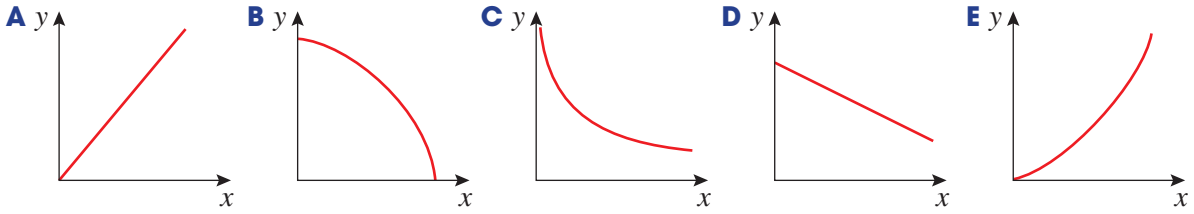
i The temperature, y, of a cup of coffee left to cool in a room, plotted against time, x.

ii The number of litres of fuel, y, left in the tank of a car moving at constant speed, plotted against time, x.

iii The distance, y, travelled by an accelerating racing car, plotted against time, x.

iv The number of harmful bacteria, y, left in the body as it responds to treatment, slowly at first then more rapidly, plotted against time, x.

v The number of dollars, y, you can buy for a number of pounds sterling, x.



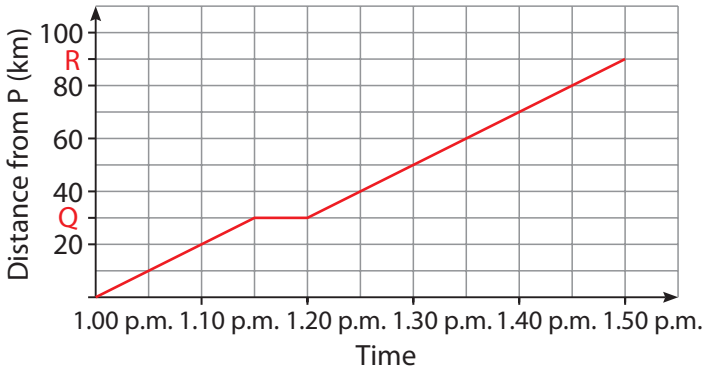
b Describe in words graphs **A** to **E**.

c All these graphs use x and y.

Suggest other suitable letters for each one.

2 P, Q and R are three consecutive stations on a railway line.

The travel graph shows the journey of a train from P to R via Q.



a **i** When does the train arrive at Q?

ii For how long does the train stop at Q?

iii What is the average speed of the train between P and Q?

iv What is the distance between stations Q and R?

b A second train leaves R at 1:15 p.m.

It travels non-stop to Q, arriving at 1:45 p.m.

i Copy the travel graph and show the second train's journey on it.

ii When do the two trains pass each other?

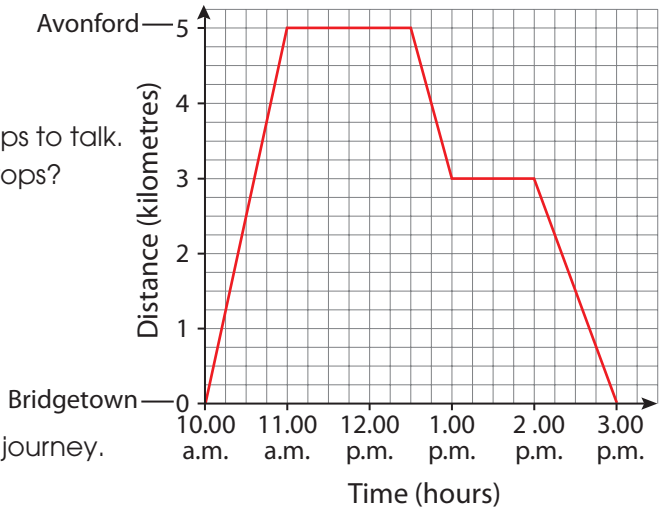
iii How far apart are the trains at 1:40 p.m.?

3 Normal body temperature is 37 °C.
A patient's body temperature is measured every hour. The table shows the readings.

Temp (°C)	37.6	37.8	37.9	37.9	38.0	38.0	38.0	37.8	37.3	37.1	37.0	37.0	37.0
Time	8 a.m.	9 a.m.	10 a.m.	11 a.m.	12 noon	1 p.m.	2 p.m.	3 p.m.	4 p.m.	5 p.m.	6 p.m.	7 p.m.	8 p.m.

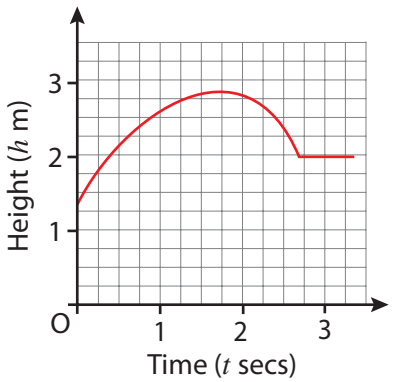
a Draw a line graph to show these data.
b What is the highest temperature?
c For how long does the patient have their highest temperature?
d When is the patient's temperature 37.9 °C?
e When does the patient reach normal temperature?
f When does the patient start to recover?
g When is the greatest temperature change?

4 Becky walks from Bridgetown to Avonford.
a When does Becky leave Bridgetown?
b How long does she spend in Avonford?
c On the way back Becky sees a friend. She stops to talk.
How far is Becky from Bridgetown when she stops?
d How long does she stop for?
e Dorje is a long-distance runner.
He runs from Bridgetown to Avonford.
He leaves at 1 p.m. and arrives at 1.30 p.m.
How far does he run?
f Copy Becky's graph on to graph paper.
Add a line to your graph representing Dorje's journey.
g At what time does Dorje pass Becky?
What is Becky doing at that time?
h How far is Dorje from Avonford when he passes Becky?



Reasoning

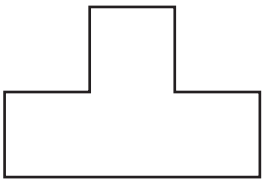
5 The graph shows the height of a basketball plotted against the time after throwing.
a What happens to the ball in the first two seconds?
b Give a reason for the shape of the graph when t is greater than 3.



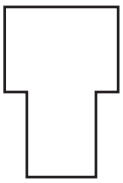
Reasoning

6 Perfume is poured into each of these containers with shapes shown below at a constant rate.
Sketch graphs showing how the perfume level rises with time.

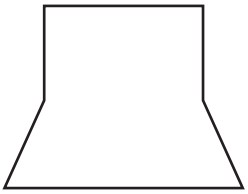
a



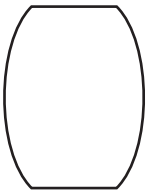
b



c



d



7 The table shows the depth of water in a harbour during one day.

Time of day	09:00	10:00	11:00	12:00	13:00	14:00	15:00	16:00	17:00	18:00	19:00	20:00	21:00
Depth (metres)	1.00	1.27	2.00	3.00	4.00	4.73	5.00	4.73	4.00	3.00	2.00	1.27	1.00

a Show this information as a smooth curve.
Use 1 cm for one hour and 2 cm for one metre.

b Estimate the depth of water at 11:30.

c A ship requires a depth of at least 2.5 m of water to enter the harbour.
Between which times is it safe for the ship to enter?

8 Davis car hire company charges for the number of kilometres travelled.
The table shows the charge for certain distances.

Distance (km)	0	50	100	150	200	250	300
Hire charge (£)	0	15	30	45	55	65	75

a Draw axes from 0 km to 300 km on the horizontal axis and £0 to £75 on the vertical axis.
Plot a graph to illustrate the information in the table.

b Describe how the hire charge changes as you travel greater distances.

c Use your graph to find how much you pay when you travel

i 75 km

ii 280 km

d Use your graph to find how far you have travelled when the hire charge is

i £70

ii £48

e The charges of a second car hire firm, U Drive, are shown in this table.

Distance (km)	0	50	100	150	200	250	300
Hire charge (£)	10	20	30	40	50	60	70

On the same axes plot a graph to show U Drive's charges.

f For what distance do the two companies charge the same amount?

9 Draw a sketch graph to describe each of the following situations.

a From rest you start running until you reach flat-out speed.
Then you slow down gradually until you collapse from exhaustion. Your distance, s, is plotted against time, t.

b The temperature in degrees Celsius, C, of the water in a kettle when it is heated to boiling, plotted against time, t.

c The number of bacteria left in the body, y, as an infection responds to treatment, slowly at first, then more rapidly, plotted against time, t.