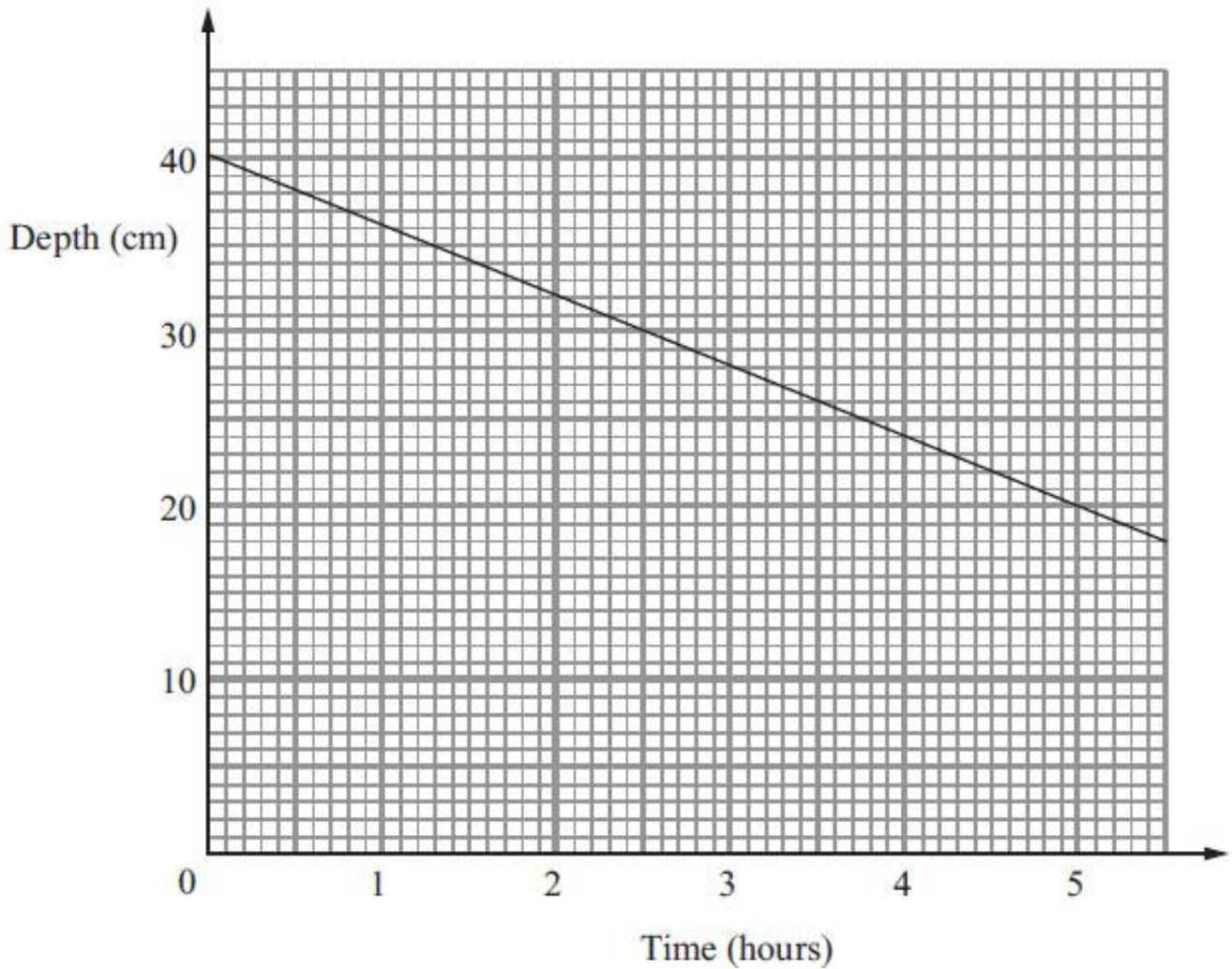# Modelling with Linear Graphs

Q1.   Water flows out of a cylindrical tank at a constant rate.

The graph shows how the depth of water in the tank varies with time.

(a)   Write down the depth of the water before any flows out.

.... cm
(1)

(b)   Work out the gradient of the straight line.

....
(2)

(c)   Write down a practical interpretation of the value you worked out in part (a).

....

....
(1)
(Total 4 marks)

Q2. The graph shows the volume of liquid (L litres) in a container at time t seconds.
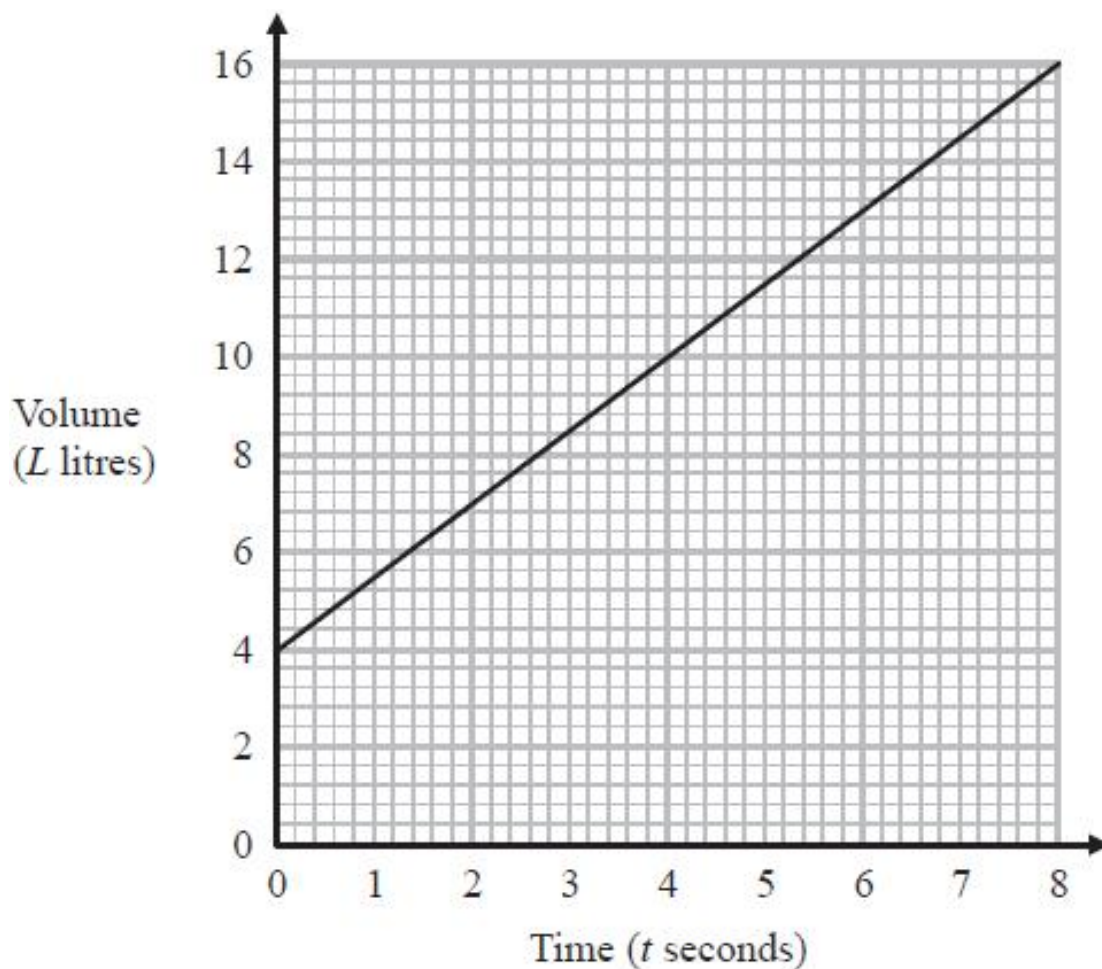
(a) Find the gradient of the graph.

....
(2)

(b) Explain what this gradient represents.

....

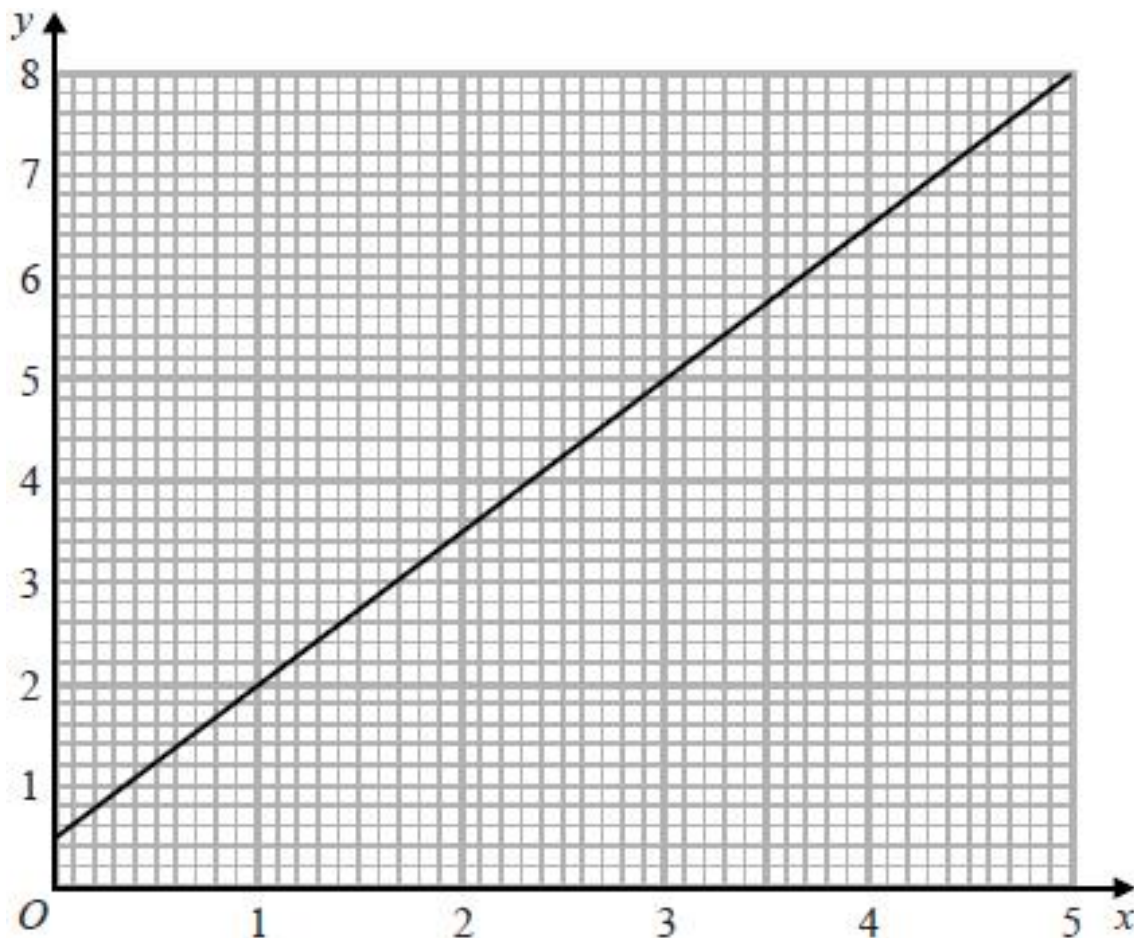...
(1)

The graph intersects the volume axis at $L = 4$

(c) Explain what this intercept represents.

....

....
(1)
(Total 4 marks)

Q3. Phone calls cost £ y for x minutes.
The graph gives the values of y for values of x from 0 to 5

(a) (i) Give an interpretation of the intercept of the graph on the y-axis.

....

....

(ii) Give an interpretation of the gradient of the graph.

....

....
(2)

(b) Find the equation of the straight line in the form $y = mx + c$

....

(2)
(Total 4 marks)

Q4. Judith and Simon are organising different parties at a hotel.
This graph can be used to find the cost, in pounds (£), for different numbers of people.
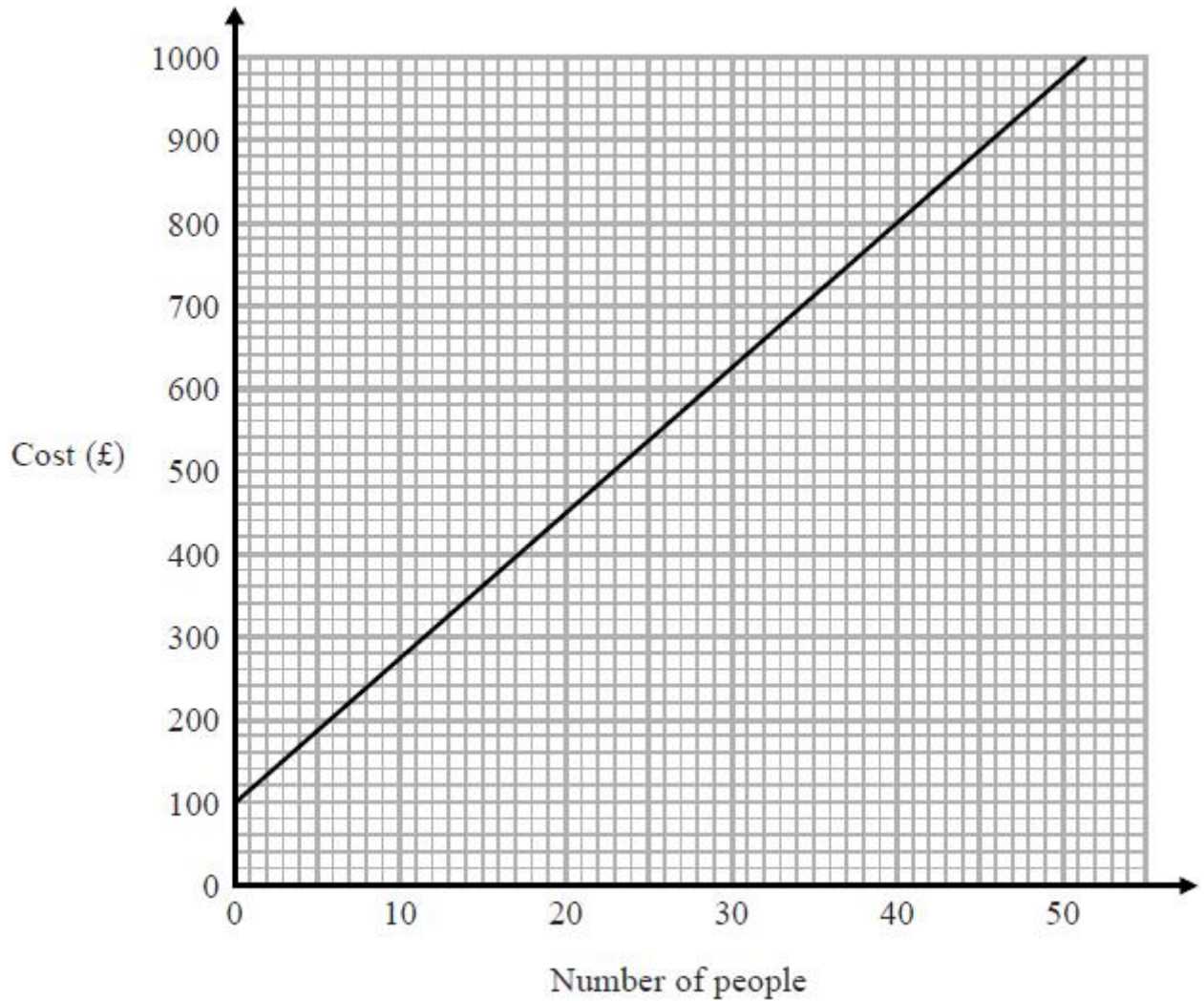
Judith has £700 to spend on a party.

(a)   Find the greatest number of people she can have at her party.

....
(1)

Simon is organising a party for 20 people.

(b)   Use the graph to find the cost.

£ ....
(1)

More than 20 people want to go to Simon's party.

(c)   Work out the cost for each extra person.

£ ....
(2)
(Total 4 marks)

Q5. The graph gives information about the volume, v litres, of petrol in the tank of Jim's car after it has travelled a distance of d kilometres.
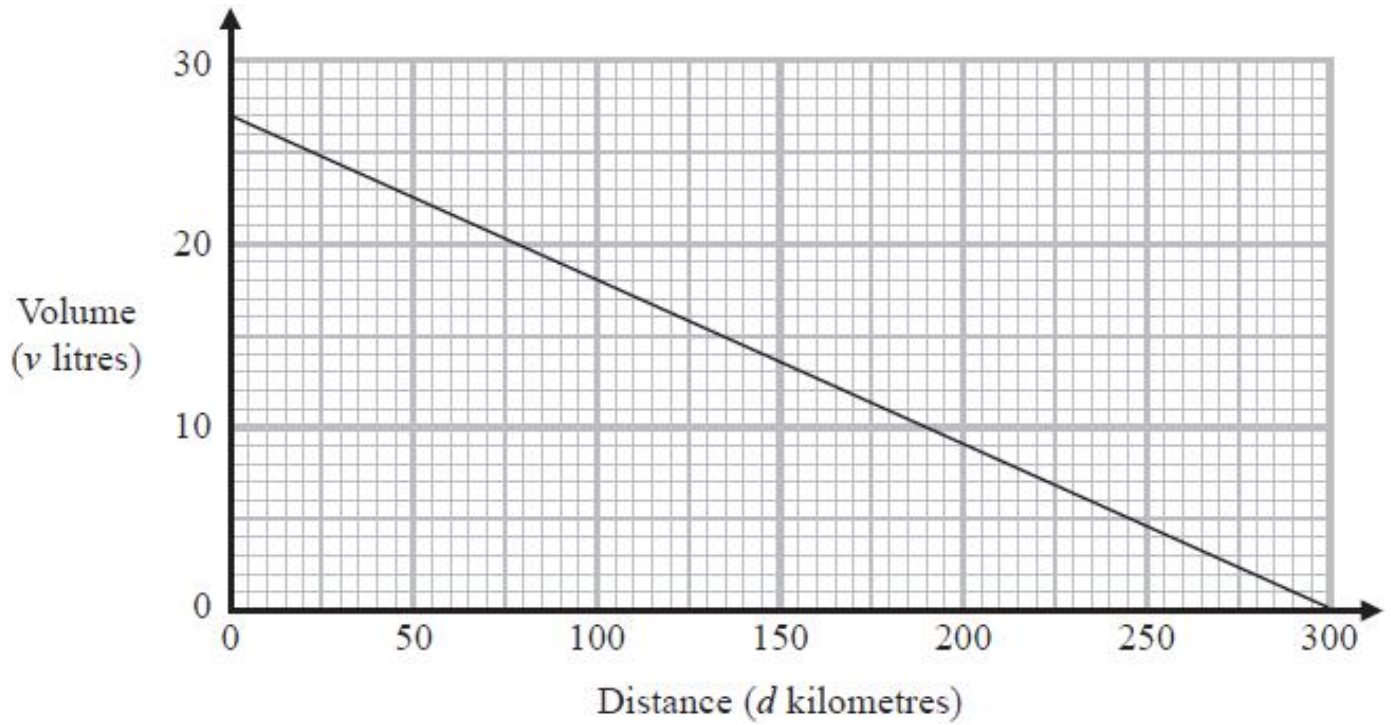
(a) Write down the starting volume of petrol in Jim's car.

.... litres

(1)

(b) Find the gradient of the graph.

....

(2)

(c) Interpret what the gradient of the graph represents.

....

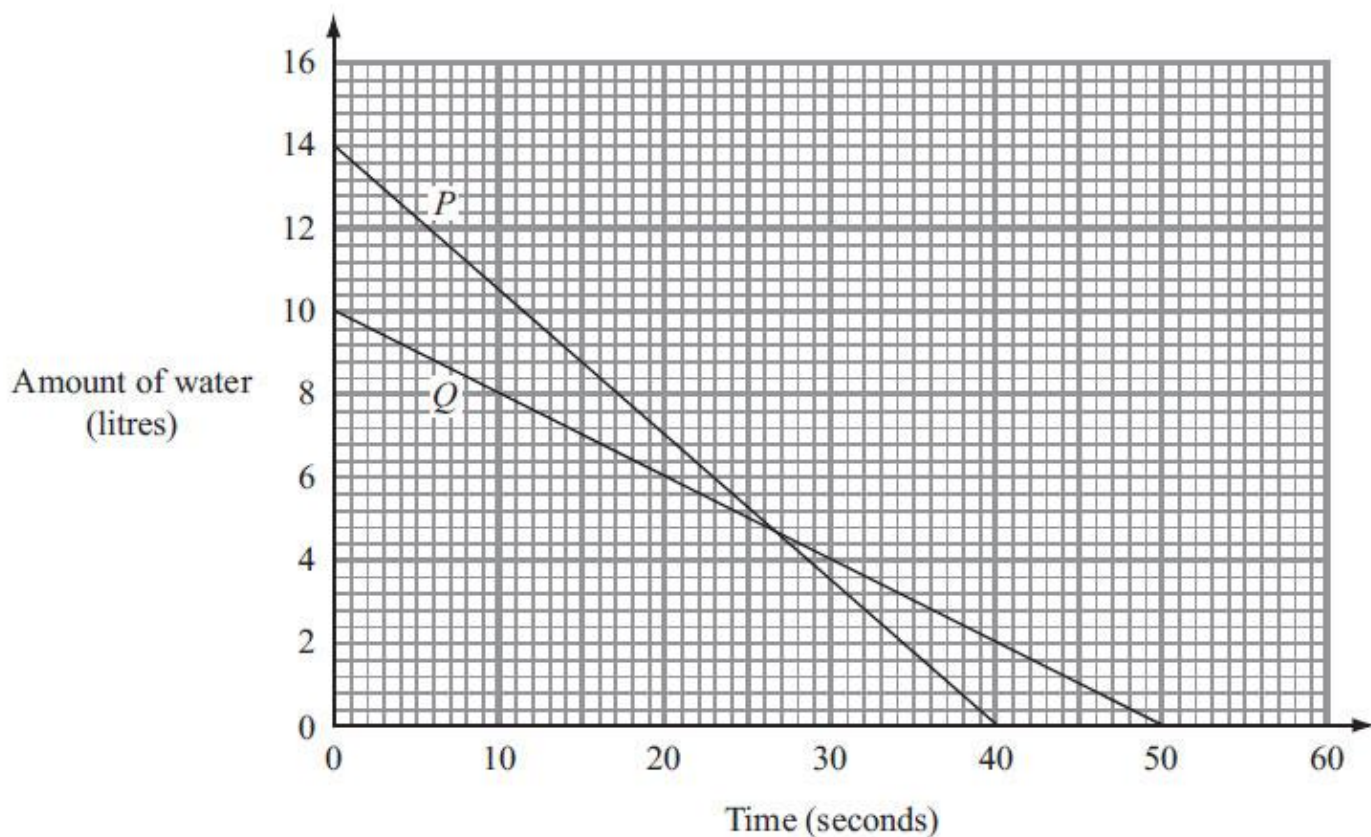...

(1)

(Total 4 marks)

Q6. Water is leaking out of two containers.
The water started to leak out of the containers at the same time.

The straight line P shows information about the amount of water, in litres, in container P.
The straight line Q shows information about the amount of water, in litres, in container Q.

(a) Work out the gradient of line P.

....

(2)

One container will become empty first.

(b) (i) Which container? You must explain your answer.

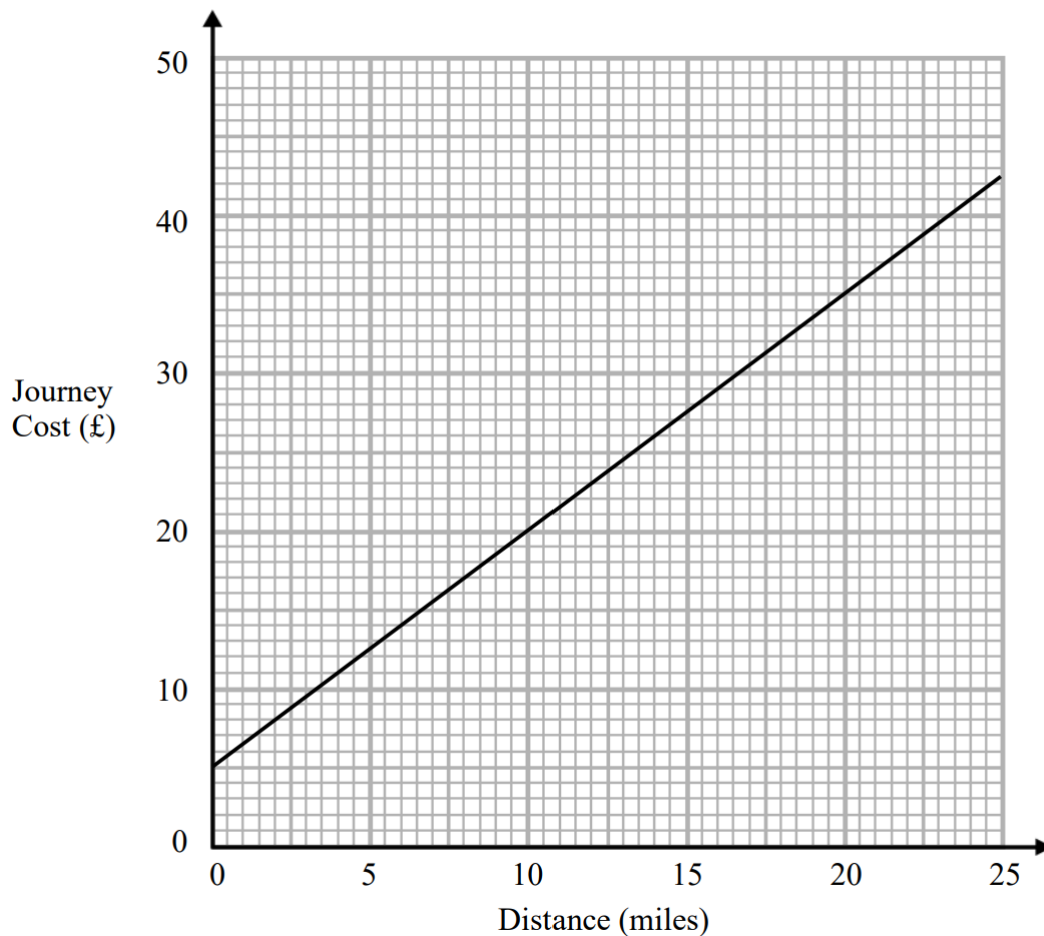...

....

(ii) How much water is then left in the other container?

.... litres

(2)

(Total 4 marks)

Q7.   Bill is a taxi driver.

You can use this graph to find the cost of his taxi for different distances.

For each journey there is a fixed charge plus a charge for the distance.

(a)   How much is the fixed charge?

£ ....

(1)

Greg is also a taxi driver. Greg's fixed charge is £10, plus £1 for every mile travelled.

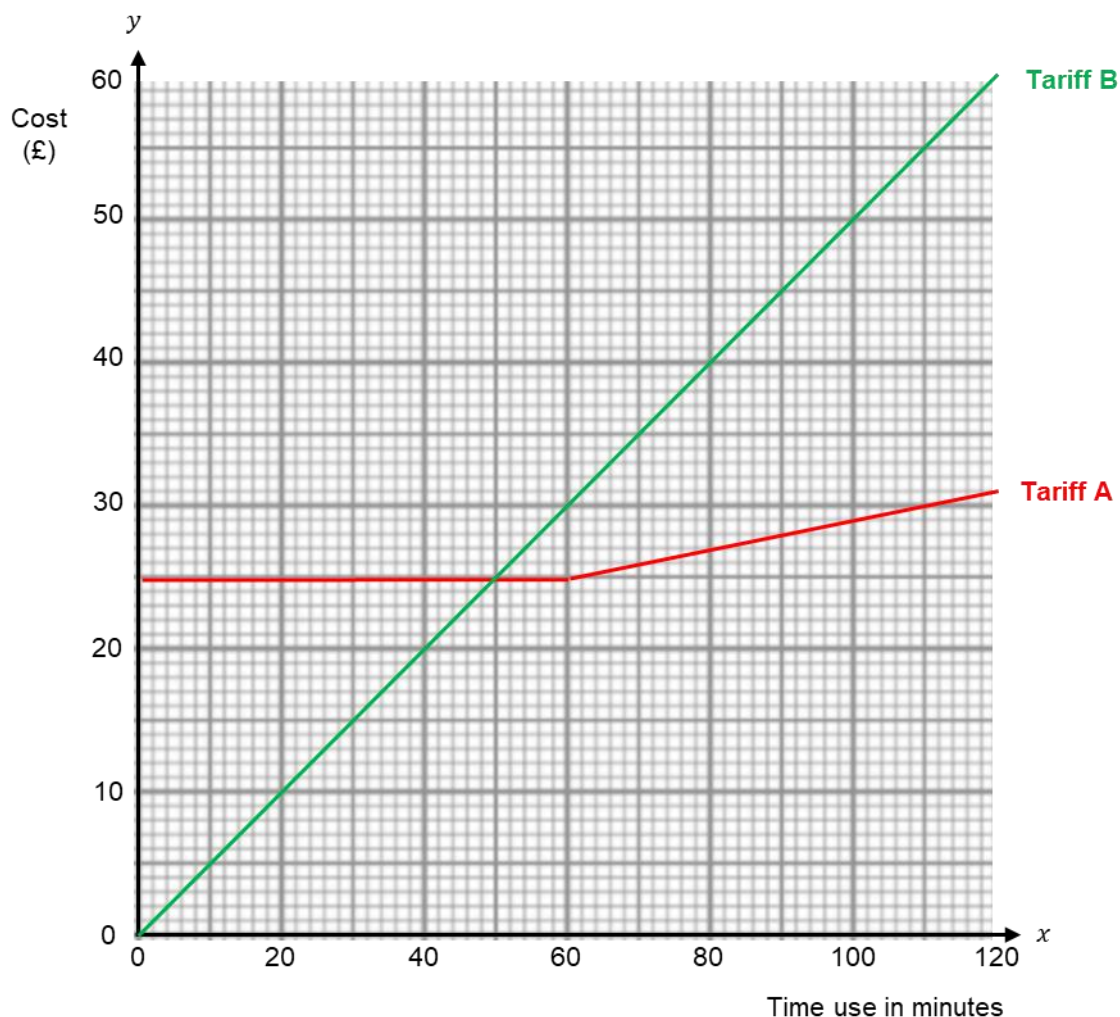(b)   After how many miles is it cheaper to travel with Greg than Bill?

Hint: draw another graph!

.... miles

(3)

(Total 4 marks)

Q8. The graph shows the cost of using a mobile phone for one month for different tariffs.

The three tariffs are

Tariff A	Rental £25	first 60 minutes free, then each minute costs 10p
Tariff B	Pay as you go	every minute costs 50p
Tariff C	Rental £20	every minute costs 20p

(a) Draw Tariff C on the graph above.

(2)

(b) Find the equation of the straight line representing Tariff C in the form $y = mx + c$

....
(2)

Isla uses her mobile phone for about 60 minutes each month.

(c) Explain which tariff would be the cheapest for her to use. You must give reasons for your answer.

....

....

....
(2)
(Total 6 marks)