

BUMPER

"BETWEEN PAPERS 2 AND 3" PRACTICE PAPER (Q1 TO Q32)

HIGHER TIER (SUMMER 2017)

QUESTIONS

NOT A "BEST" GUESS PAPER.




NEITHER IS IT A "PREDICTION" ... ONLY THE EXAMINERS KNOW WHAT IS GOING TO COME UP! FACT!

YOU ALSO NEED TO REMEMBER THAT JUST BECAUSE A TOPIC CAME UP ON PAPER 1 OR PAPER 2 IT MAY STILL COME UP ON PAPER 3

WE KNOW HOW IMPORTANT IT IS TO PRACTISE, PRACTISE, PRACTISE SO WE'VE COLLATED A LOAD OF QUESTIONS THAT WEREN'T EXAMINED IN THE PEARSON/EDExcel NEW 9-1 GCSE MATHS PAPER 1 AND PAPER 2 BUT WE CANNOT GUARANTEE HOW A TOPIC WILL BE EXAMINED IN THE FINAL PAPER
ENJOY!

MEL & SEAGER

NB: SOME OF THESE QUESTIONS MAY HAVE ALSO BEEN INCLUDED IN THE PAPERS USED BETWEEN PAPERS 1 AND 2 ... THE PRACTISE IS GOOD FOR YOU!

	Marks	Actual	  
Q1. Estimate of the mean	4		
Q2. Forming expressions/equations	2		
Q3. Linear simultaneous equations	5		
Q4. Linear simultaneous equations	4		
Q5. Forming equations	5		
Q6 Forming & solving equations	6		
Q7. Stratified sampling	3		
Q8. Capture – recapture	4		
Q9. Area of a triangle/ Bounds	3		
Q10 Pythagoras and trigonometry	5		
Q11 Pythagoras and trigonometry	4		
Q12. Surds	3		
Q13. Surds	4		
Q14. Time series	2		
Q15. Time series	3		
Q16. Line graphs	6		
Q17. Frequency polygon	5		
Q18. Boxplot	4		
Q19. Quadratics	3		
Q20. Quadratics	4		
Q21. Direct Proportion	4		
Q22. Proof	2		
Q23. Proof	4		
Q24. Rearranging/Simultaneous Eqns	6		
Q25. Distance / Time graphs	4		
Q26. Speed/Time	3		
Q27. Forming and solving	5		
Q28. Volume of prisms	6		
Q29. Volume of cylinders	6		
Q30. Frustums	4		
Q31. Bearings	6		
Q32. Scale drawings	3		

Q1. Sumeet records the times, in minutes, for 40 runners to finish a half marathon. Information about these times is shown in the table.

Time (t minutes)	Frequency
$60 < t \leq 90$	10
$90 < t \leq 120$	14
$120 < t \leq 150$	9
$150 < t \leq 180$	5
$180 < t \leq 210$	2

Calculate an estimate for the mean time.

..... minutes

(Total for question = 4 marks)

Q2. Alex is x cm tall.

Bob is 10cm taller than Alex.

Cath is 4cm shorter than Alex.

Write an expression, in terms of x , for the mean of their heights in centimetres.

.....

(Total for question = 3 marks)

Q3. Paper clips are sold in small boxes and in large boxes.

There is a total of 1115 paper clips in 4 small boxes and 5 large boxes.

There is a total of 530 paper clips in 3 small boxes and 2 large boxes.

Work out the number of paper clips in each small box and in each large box.

(Total for Question is 5 marks)

Q4. The Singh family and the Peterson family go to the cinema.

The Singh family buy 2 adult tickets and 3 child tickets.
They pay £28.20 for the tickets.

The Peterson family buy 3 adult tickets and 5 child tickets.
They pay £44.75 for the tickets.

Find the cost of each adult ticket and each child ticket.

(Total for question = 5 marks)

Q5. There are

- x stamps in a small packet
- $(x + 3)$ stamps in a medium packet
- and $(x + 4)$ stamps in a large packet

The total number of stamps in the three packets is N .

(i) Write down an equation for N in terms of x .
Give your equation in its simplest form.

There is a total of 61 stamps.

(ii) Work out the number of stamps in the medium packet.

(Total for question = 5 marks)

Q6. PQR is an isosceles triangle.

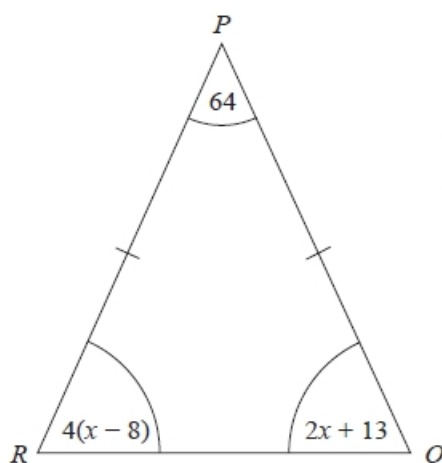


Diagram NOT
accurately drawn

$$PQ = PR$$

All the angles are in degrees.

Work out the value of x .

$x = \dots\dots\dots$

(Total for question = 4 marks)

Q7. Henri is carrying out a survey of the people aged 65 and over in his village.

The table shows information about these people.

Age	Male	Female
65 – 69	20	22
70 – 74	18	21
75 – 79	15	18
80 – 84	8	16
85 – 89	5	10
90+	2	5
Total	68	92

Henri is going to take a sample of 30 people stratified by age.

How many people aged 75 – 79 should be in the sample?

(Total for Question is 3 marks)

Q8. Toga wants to estimate the number of termites in a nest.

On Monday Toga catches 80 termites.
 He puts a mark on each termite.
 He then puts all 80 termites back in the nest.

On Tuesday Toga catches 60 termites.
 12 of these termites have a mark on them.

Work out an estimate for the total number of termites in the nest.
 You must write down any assumptions you have made.

$\dots\dots\dots$

(Total for question = 4 marks)

Q9. Jerry wants to cover a triangular field, ABC , with fertiliser.

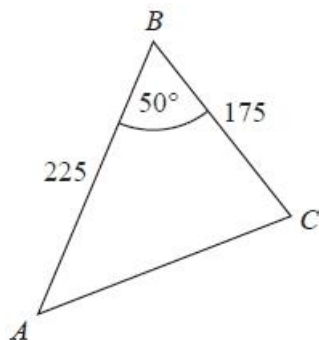


Diagram **NOT** accurately drawn

Here are the measurements Jerry makes

- angle $ABC = 50^\circ$ correct to the nearest degree,
- $BA = 225$ m correct to the nearest 5 m,
- $BC = 175$ m correct to the nearest 5 m.

Work out the upper bound for the area of the field.
You must show your working.

.....m²

(Total for Question is 3 marks)

Q10. The diagram shows a quadrilateral $ABCD$.

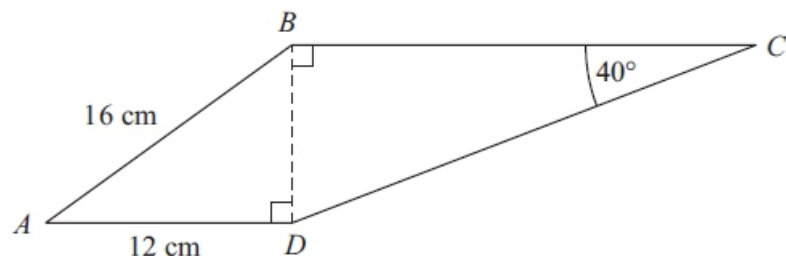


Diagram **NOT** accurately drawn

- $AB = 16$ cm.
- $AD = 12$ cm.
- Angle $BCD = 40^\circ$.
- Angle $ADB = \text{angle } CBD = 90^\circ$.

Calculate the length of CD .
Give your answer correct to 3 significant figures.

..... cm

(Total for Question is 5 marks)

Q11.

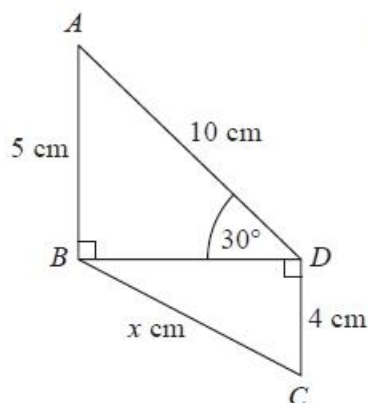


Diagram NOT accurately drawn

In the diagram,

- triangles ABD and BCD are right-angled triangles
- $AB = 5$ cm
- $AD = 10$ cm
- $CD = 4$ cm
- Angle $ADB = 30^\circ$

Work out the value of x .

Give your answer correct to 2 decimal places.

.....cm

(Total for question = 4 marks)

Q12. Rationalise the denominator of

$$\frac{(4 + \sqrt{2})(4 - \sqrt{2})}{\sqrt{7}}$$

Give your answer in its simplest form.

.....

(Total for question = 3 marks)

Q13. a) Rationalise the denominator of

$$\frac{12}{\sqrt{3}}$$

..... (2)

(b) Work out the value of $(\sqrt{2} + \sqrt{8})^2$

..... (2)

(Total for Question is 4 marks)

Q14. The graph shows information about the population of a village in thousands.



(a) What was the population of the village in 1991?

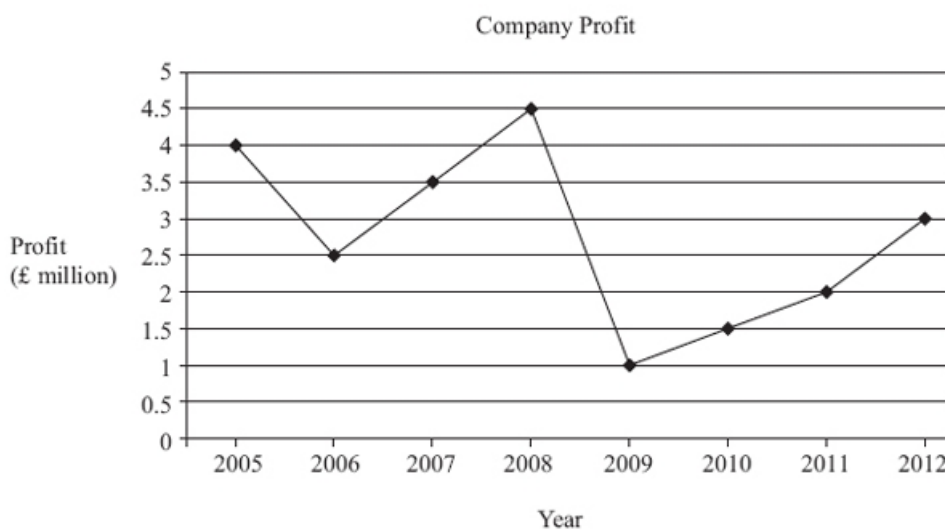
..... (1)

(b) What was the increase in population from 1981 to 2011?

..... (1)

(Total for question = 2 marks)

Q15. The graph shows information about the profit a company made each year from 2005 to 2012



(a) What was the profit in 2006?

(1)

(b) In which year did the company make the most profit?

(1)

(c) Describe the change in profit from 2009 to 2012

(1)

(Total for Question is 3 marks)

Q16. On Monday morning, Shruti has £135.70 in her bank account.

On Monday, Shruti

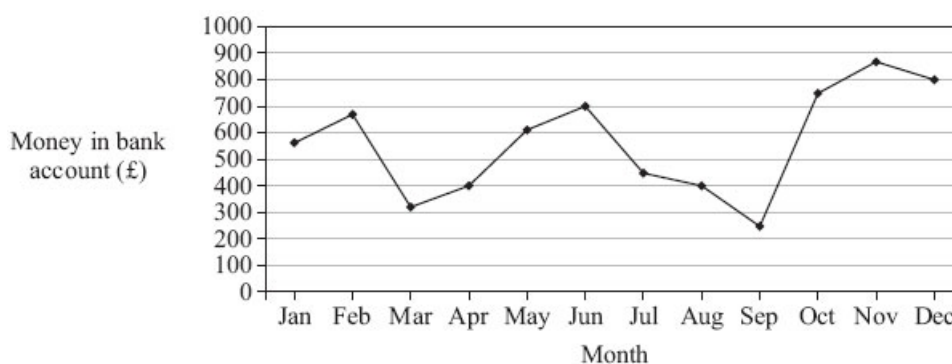
- puts £85 into her bank account
- spends £45.56 from her bank account

(a) How much money is in Shruti's bank account at the end of Monday?

(3)

Shruti wants to find out how much money was in her bank account at the beginning of each month for the last twelve months.

This graph shows this information.



(b) How much money was in Shruti's bank account at the beginning of June?

(1)

(c) At the beginning of which month was there the most money in Shruti's bank account?

(1)

(d) At the beginning of which **two** months was there the same amount of money in Shruti's bank account?

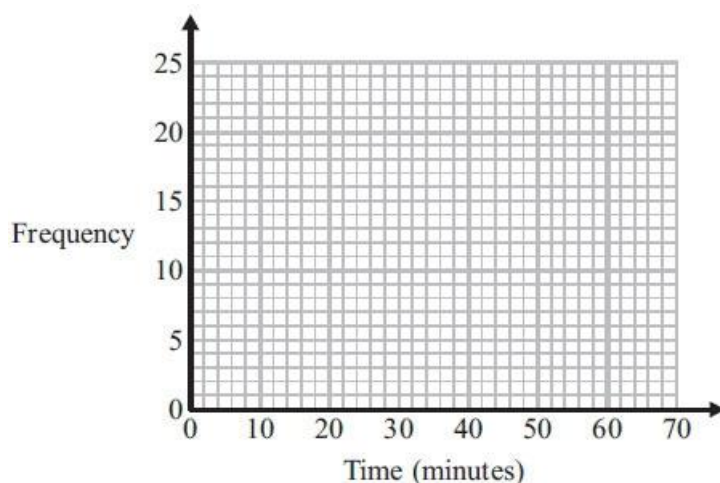
(1)

(Total for Question is 6 marks)

Q17. The frequency table gives information about the times it took some office workers to get to the office one day.

Time (t minutes)	Frequency
$0 < t \leq 10$	4
$10 < t \leq 20$	8
$20 < t \leq 30$	14
$30 < t \leq 40$	16
$40 < t \leq 50$	6
$50 < t \leq 60$	2

(a) Draw a frequency polygon for this information.



(2)

(b) Write down the modal class interval.

(1)

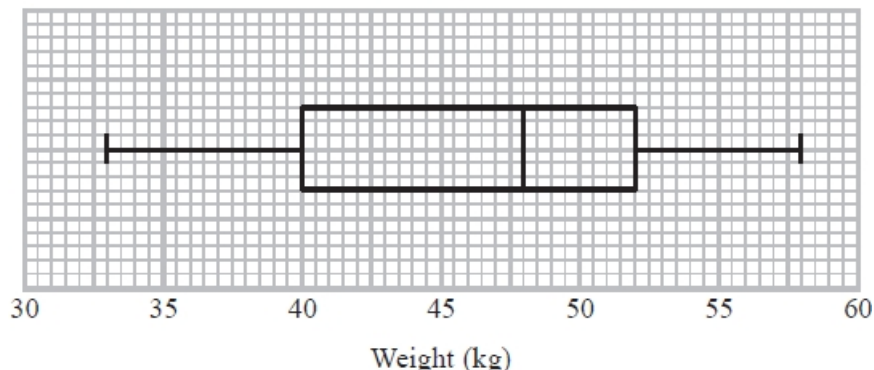
One of the office workers is chosen at random.

(c) Work out the probability that this office worker took more than 40 minutes to get to the office.

(2)

(Total for Question is 5 marks)

Q18. The box plot gives information about the weights of a group of children.



(a) Write down the median.

.....kg (1)

(b) Work out the interquartile range.

.....kg (1)

There are 80 children in the group.

(c) Work out an estimate for the number of children who weigh 52 kg or more.

..... (2)

(Total for Question is 4 marks)

Q19. Solve, by factorising, the equation $8x^2 - 30x - 27 = 0$

(Total for Question is 3 marks)

Q20. The expression $x^2 - 8x + 6$ can be written in the form $(x - p)^2 + q$ for all values of x .

(a) Find the value of p and the value of q .

$p = \dots\dots\dots$

$q = \dots\dots\dots$ **(3)**

The graph of $y = x^2 - 8x + 6$ has a minimum point.

(b) Write down the coordinates of this point.

$(\dots\dots\dots, \dots\dots\dots)$ **(1)**

(Total for question = 4 marks)

Q21. y is directly proportional to the square of x .

When $x = 3$, $y = 36$

Find the value of y when $x = 5$

$\dots\dots\dots$
(Total for Question is 4 marks)

Q22. Prove that $(n - 1)^2 + n^2 + (n + 1)^2 = 3n^2 + 2$

(Total for Question is 2 marks)

Q23. Prove algebraically that the difference between the squares of any two consecutive integers is equal to the sum of these two integers.

(Total for Question is 4 marks)

Q24. (a) Make t the subject of the formula

$$2(a + t) = 5t + 7$$

$$t = \dots\dots\dots (3)$$

(b) Solve the simultaneous equations

$$3x - 4y = 8$$

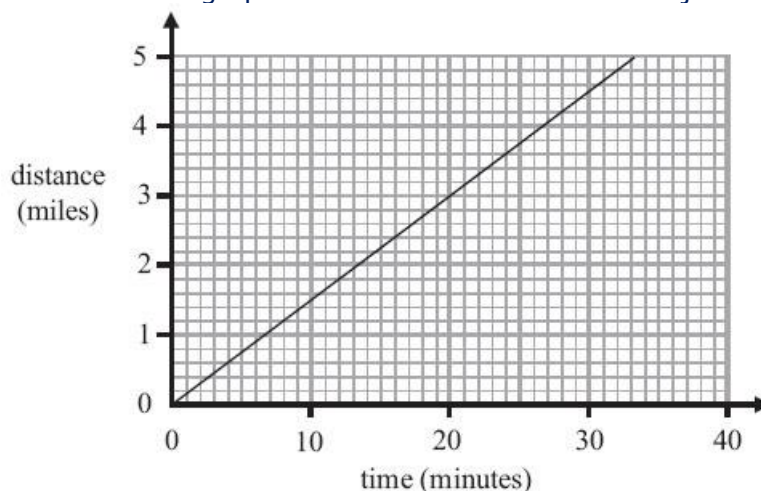
$$9x + 5y = -1.5$$

$$x = \dots\dots\dots$$

$$y = \dots\dots\dots (3)$$

Total for Question is 6 marks)

Q25. Lisa cycles to work. The travel graph shows information about her journey to work on Tuesday.

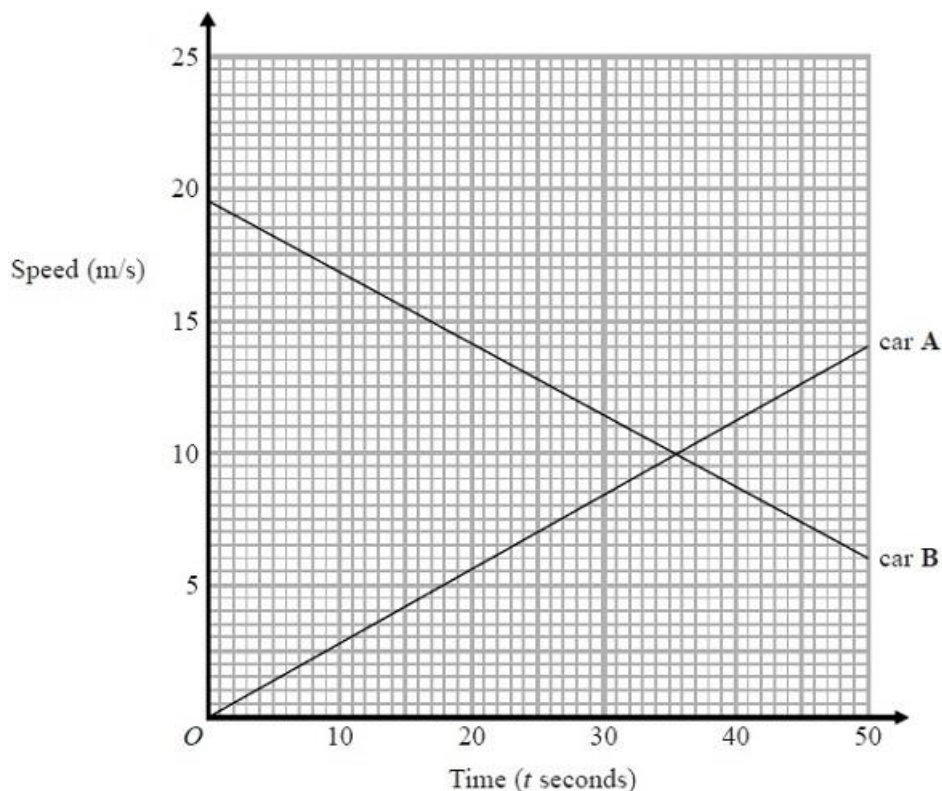


Martin also cycles to work.
On Tuesday his average speed was 16 km per hour.

Who has the greater average speed, Lisa or Martin?
You must show all your working.

(Total for Question is 4 marks)

Q26. The graph shows information about the speeds of two cars.



(a) Work out the gradient of the line for car A.

(2)

(b) After how many seconds is the speed of car A equal to the speed of car B?

..... seconds **(1)**

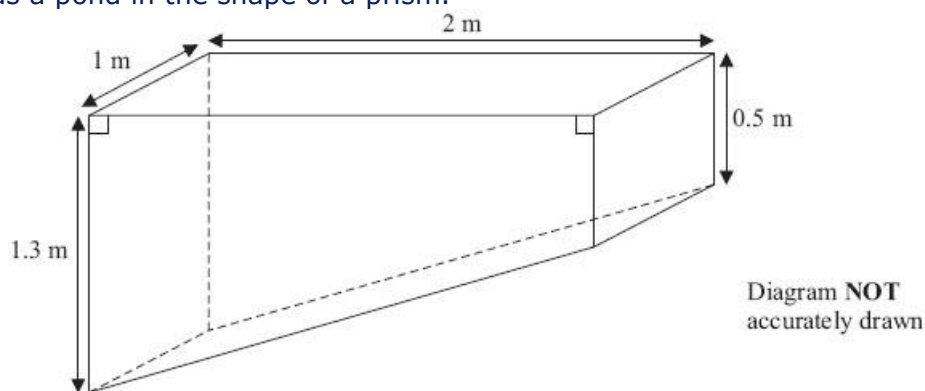
(Total for Question is 3 marks)

Q27. An equilateral triangle has sides of length 8 cm. A square has the same perimeter as the triangle. Work out the area of the square.

.....

(Total for question = 5 marks)

Q28. Sumeet has a pond in the shape of a prism.



The pond is completely full of water.
 Sumeet wants to empty the pond so he can clean it.
 Sumeet uses a pump to empty the pond.

The volume of water in the pond decreases at a constant rate.
 The level of the water in the pond goes down by 20 cm in the first 30 minutes.

Work out how much more time Sumeet has to wait for the pump to empty the pond completely.

(Total for Question is 6 marks)

Q29. The diagram shows a large tin of pet food in the shape of a cylinder.

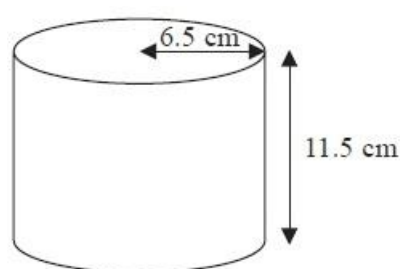


Diagram NOT accurately drawn

The large tin has a radius of 6.5 cm and a height of 11.5 cm.

A pet food company wants to make a new size of tin.

The new tin will have a radius of 5.8 cm.

It will have the same volume as the large tin.

Calculate the height of the new tin.

Give your answer correct to one decimal place.

..... cm
(Total for Question is 3 marks)

Q30.

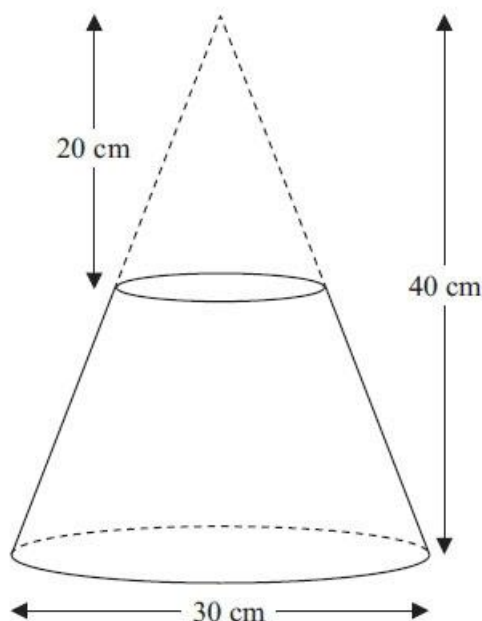


Diagram NOT accurately drawn

A frustum is made by removing a small cone from a similar large cone.

- The height of the small cone is 20 cm.
- The height of the large cone is 40 cm.
- The diameter of the base of the large cone is 30 cm.

Work out the volume of the frustum.
Give your answer correct to 3 significant figures.

.....cm³

(Total for Question is 4 marks)

Q31. Manchester airport is on a bearing of 330° from a London airport.

(a) Find the bearing of the London airport from Manchester airport.

.....° (2)

The London airport is 200 miles from Manchester airport.

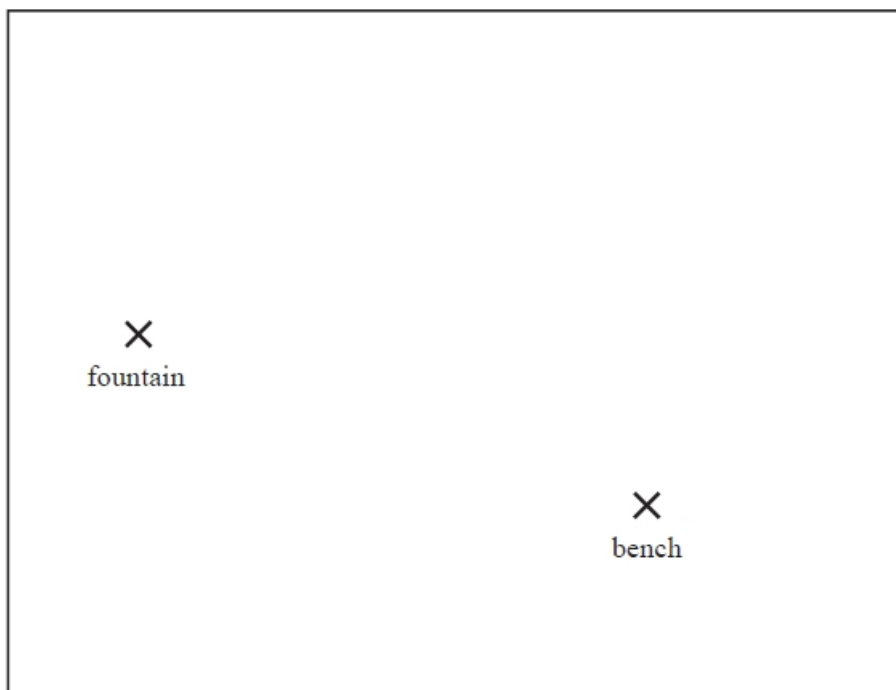
A plane leaves Manchester airport at 10 am to fly to the London airport.
The plane flies at an average speed of 120 mph.

(b) What time does the plane arrive at the London airport?

.....(4)

(Total for question = 6 marks)

Q32. The diagram shows a scale drawing of a garden.



Scale: 1 centimetre represents 2 metres

Haavi is going to plant a tree in the garden.

The tree must be

- less than 7 metres from the fountain,
- less than 12 metres from the bench.

On the diagram show, by shading, the region in which Haavi can plant the tree.

(Total for question = 3 marks)