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General Certificate of Secondary Education
2009

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71	
Candidate Number	
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Mathematics



Module N4 Paper 2
(With calculator)
Higher Tier
[GMN42]



GMN42

MONDAY 18 MAY
2.45 pm – 3.45 pm

TIME

1 hour.

INSTRUCTIONS TO CANDIDATES

Write your Centre Number and Candidate Number in the spaces provided at the top of this page.

Write your answers in the spaces provided in this question paper.

Answer **all nine** questions.

Any working should be clearly shown in the spaces provided since marks may be awarded for partially correct solutions.

INFORMATION FOR CANDIDATES

The total mark for this paper is 44.

Figures in brackets printed down the right-hand side of pages indicate the marks awarded to each question or part question.

You should have a calculator, ruler, compasses, set-square and protractor.

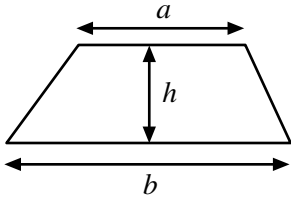
The Formula Sheet is on page 2.

For Examiner's use only	
Question Number	Marks
1	
2	
3	
4	
5	
6	
7	
8	
9	

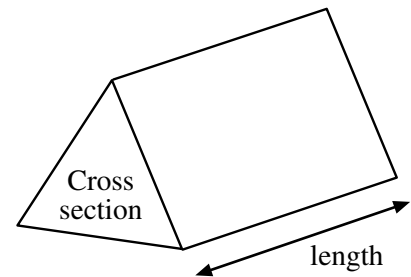
Total Marks	
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Formula Sheet

Area of trapezium = $\frac{1}{2}(a + b)h$



Volume of prism = area of cross section \times length

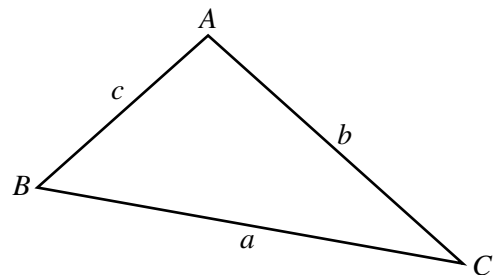


In any triangle ABC

Area of triangle = $\frac{1}{2}ab \sin C$

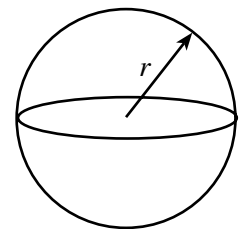
Sine rule: $\frac{a}{\sin A} = \frac{b}{\sin B} = \frac{c}{\sin C}$

Cosine rule: $a^2 = b^2 + c^2 - 2bc \cos A$



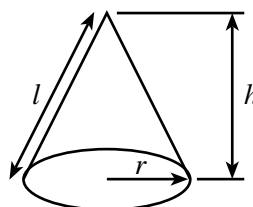
Volume of sphere = $\frac{4}{3}\pi r^3$

Surface area of sphere = $4\pi r^2$



Volume of cone = $\frac{1}{3}\pi r^2 h$

Curved surface area of cone = $\pi r l$



Quadratic equation:

The solutions of $ax^2 + bx + c = 0$, where $a \neq 0$, are given by

$$x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$$

1 Calculate the volume of a sphere of diameter 70 cm.

Answer _____ [3]

Examiner Only	
Marks	Remark

- 2 Peter is a gardener. He recorded how much money he earned each week for 40 weeks.

Money in £ (m)	Frequency	Money in £	Cumulative Frequency
$180 \leq m < 200$	4	<200	4
$200 \leq m < 220$	7	<220	11
$220 \leq m < 240$	12	<240	
$240 \leq m < 260$	9		
$260 \leq m < 280$	5		
$280 \leq m < 300$	2		
$300 \leq m < 320$	1		

(a) Complete the table. [1]

(b) Draw the cumulative frequency graph on the opposite page. [3]

(c) Use the graph to estimate

(i) the median,

Answer £ _____ [1]

(ii) the inter-quartile range,

Answer £ _____ [2]

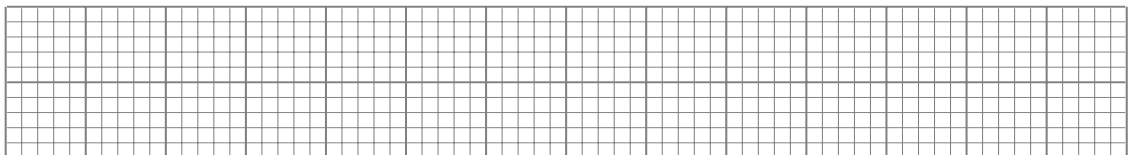
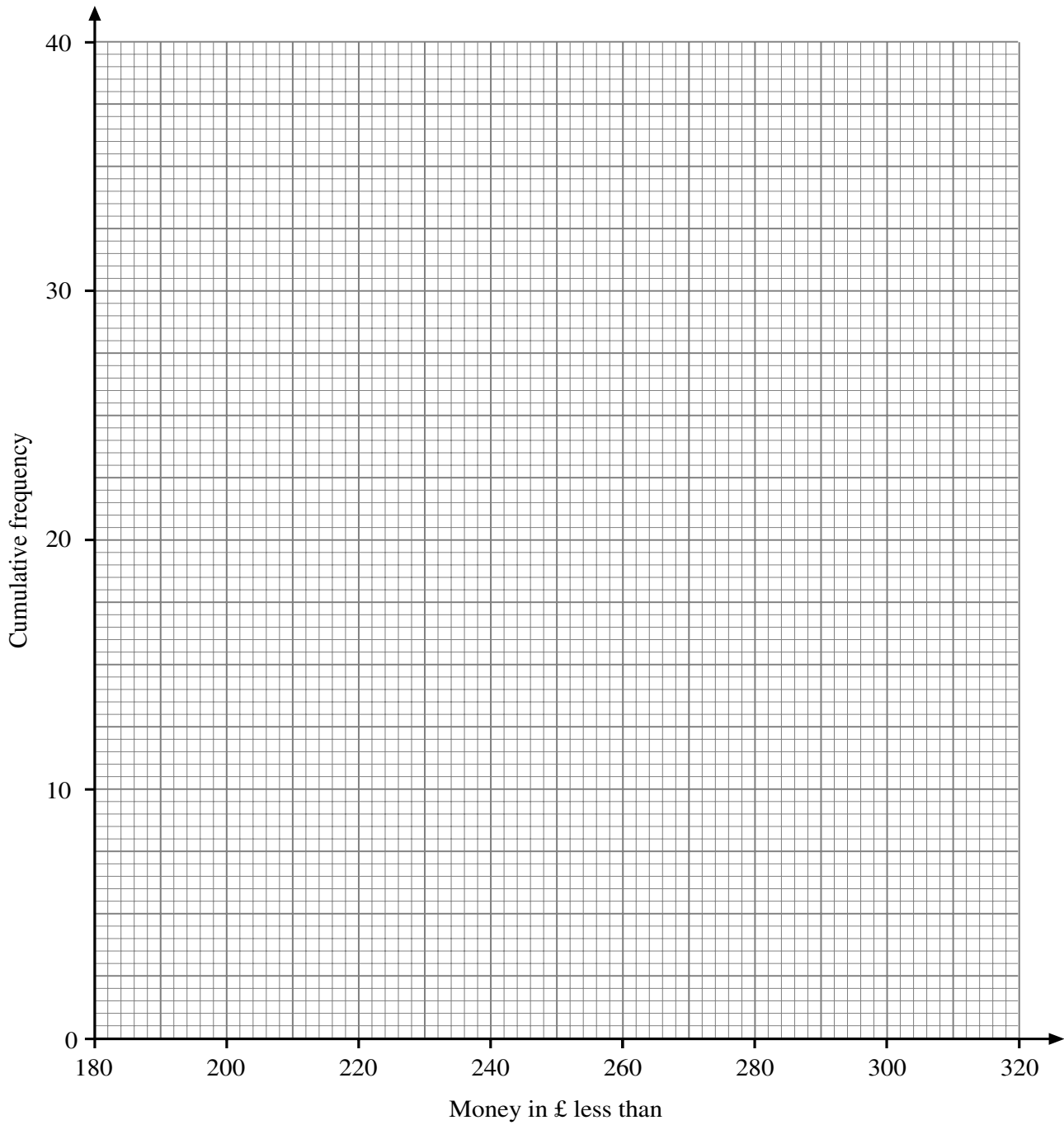
(iii) in how many weeks Peter earned more than £225.

Answer _____ weeks [2]

(d) The lowest amount Peter earned was £185 and the highest amount was £315.

Draw a box plot opposite to illustrate Peter's earnings. [3]

Examiner Only	
Marks	Remark



3 Explain the difference between discrete data and continuous data and give one example of each.

_____ [2]

Examiner Only	
Marks	Remark

4

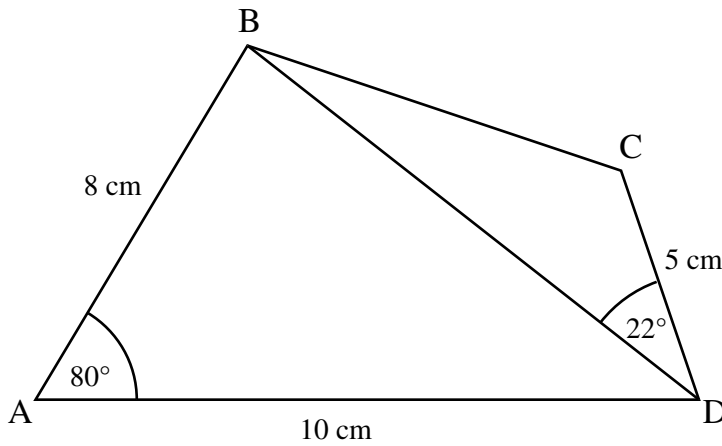


Diagram not drawn accurately

ABCD is a quadrilateral.
 AB = 8 cm, AD = 10 cm, CD = 5 cm.
 Angle BAD = 80° and angle BDC = 22°.

Calculate

(a) the length of BD,

Answer _____ cm [3]

(b) the area of triangle BCD.

Answer _____ cm² [2]

5 A man walks x km East and then $(x + 8)$ km North.
He is now 12 km from his starting point.

(a) Show that x satisfies the equation $x^2 + 8x - 40 = 0$

[3]

(b) Solve the equation to find x , giving your answer correct to 3 significant figures.

Answer $x =$ _____ [3]

Examiner Only	
Marks	Remark

6 (a)

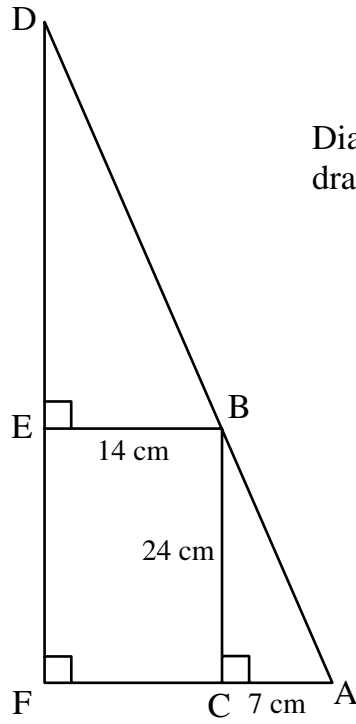


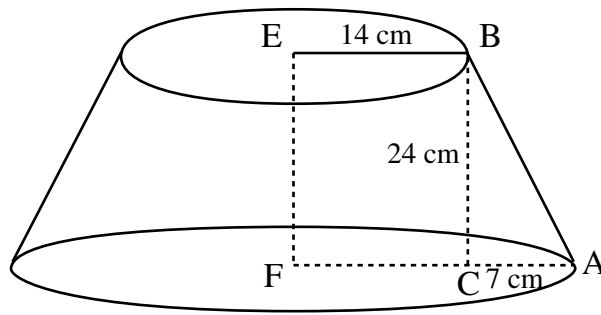
Diagram not drawn accurately

ABC and BDE are similar triangles.
BE = 14 cm, BC = 24 cm, AC = 7 cm
Find the length of DE.

Answer _____ cm [2]

Examiner Only	
Marks	Remark

- (b) The diagram below shows the frustum of a cone.
 The circular top of the frustum, centre E, is of radius 14 cm.
 The circular base of the frustum, centre F, is of radius 21 cm.

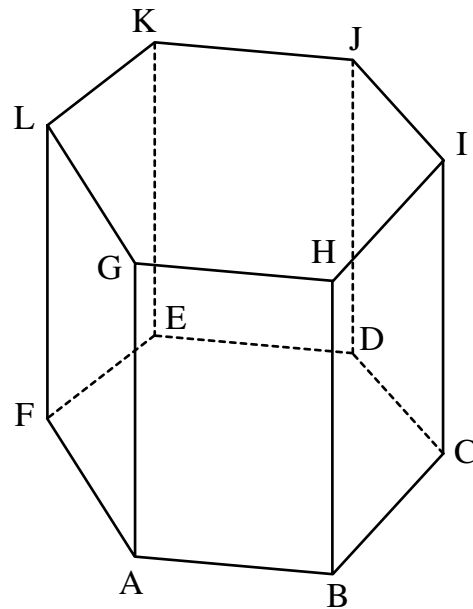


Using the answer found in part (a), find the volume of the frustum of the cone.

Answer _____ cm^3 [4]

Examiner Only	
Marks	Remark

9



ABCDEF, GHIJKL, the base and top of the prism, are regular hexagons.
AB = 20 cm, AG = 30 cm.
Calculate the angle between AJ and the base ABCDEF.

Answer _____° [4]

Examiner Only	
Marks	Remark

THIS IS THE END OF THE QUESTION PAPER
