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Rewarding Learning

Centre Number	
71	

Candidate Number

General Certificate of Secondary Education
January 2010

Mathematics

Module N3 Paper 1
(Non-calculator)
Higher Tier

[GMN31]

GMN31

TUESDAY 12 JANUARY

9.15 am – 10.15 am

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 thirteen** questions.
Any working should be clearly shown in the spaces provided since marks may be awarded for partially correct solutions.
You **must not** use a calculator for this paper.

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 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	
10	
11	
12	
13	
Total Marks	

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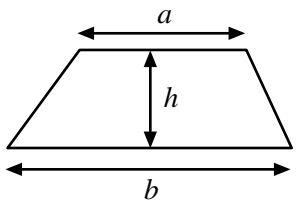
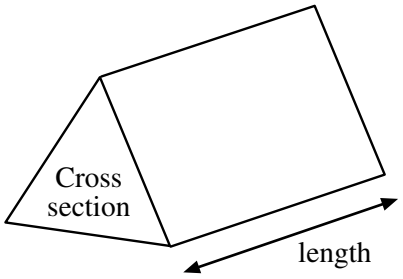
Formula Sheet

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



Volume of prism = area of cross section × length

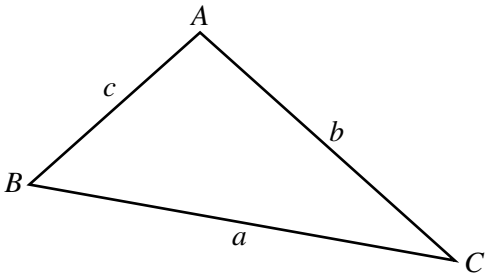


In any triangle ABC

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

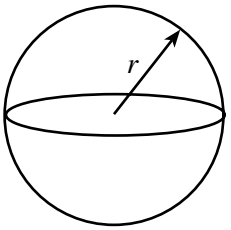
Sine rule : $\dfrac{a}{\sin A} = \dfrac{b}{\sin B} = \dfrac{c}{\sin C}$

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



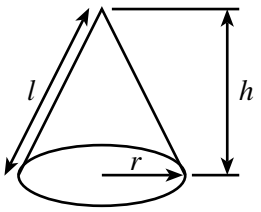
Volume of sphere = $\frac{4}{3}\pi r^3$

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

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

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Examiner Only	
Marks	Remark

1 The BBC wishes to survey opinion on a new TV series.
A researcher interviews 250 people leaving a supermarket between 10 am and noon, one Monday morning.

Give one reason why this survey may be biased.

_____

_____ [1]

---

2 **(a)** Expand $4(3 - x)$

Answer _____ [1]

(b) Factorise $k^2 - k$

Answer _____ [1]

(c) Solve $7x + 5 = 3x + 8$

Answer x = _____ [3]

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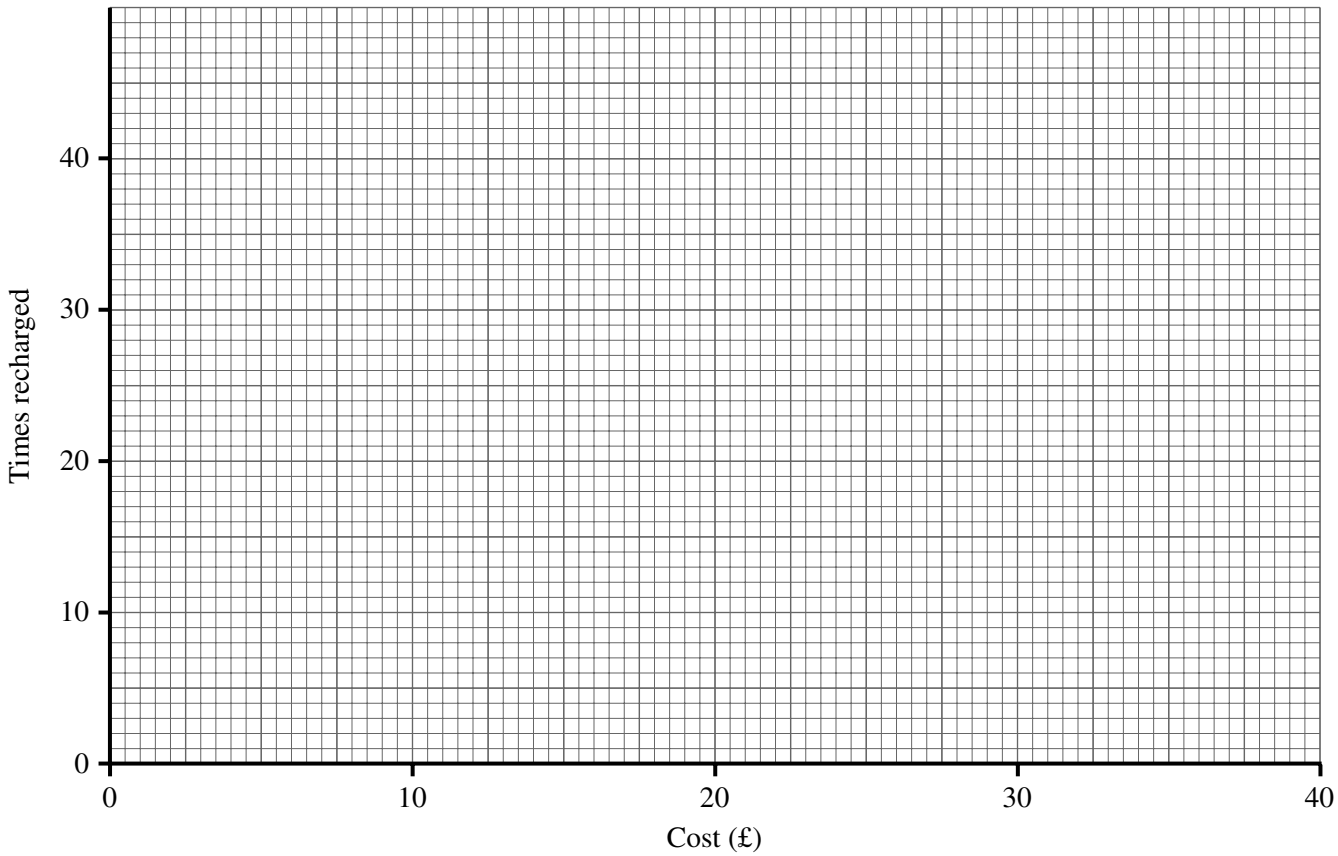
3 Seven friends compared the costs of their mobile phones and how many times they had to recharge them in a period of 2 months.

The table shows the results.

Cost (£)	17	19	21	23	25	27	30
Times recharged	38	31	28	24	20	16	8

(a) Draw a scatter graph for this data. [2]



(b) Draw a line of best fit on the scatter graph. [1]

(c) Estimate the cost of another mobile phone which had to be recharged four times.

Answer £_____ minutes [1]

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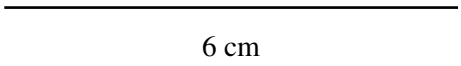
4 A parallelogram has sides 6 cm and 5 cm. The shorter diagonal is 5 cm.

Make an **accurate** drawing of this parallelogram.
One side has been drawn for you.



[4]

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Marks	Remark

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Marks	Remark

5 **(a)** $\frac{5}{8}$ of the length of a wall has been completed.

If there is still 30 ft to build, how long will the wall be when it is finished?

Answer _____ ft [3]

(b) Calculate $6\frac{3}{4} - 4\frac{1}{3}$

Answer _____ [3]

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Marks	Remark

6 Write down an expression for the nth term of the sequence

–3, –6, –9, –12, . . .

Answer nth term = _____ [1]

---

7 Jake asked a number of students in his year group how much they paid for their home computer.
The results are shown in the frequency table.

Price (£P)	**Frequency**
$0 < P \leqslant 500$	5
$500 < P \leqslant 1000$	20
$1000 < P \leqslant 1500$	10
$1500 < P \leqslant 2000$	4
$2000 < P \leqslant 2500$	1

Calculate an estimate for the mean price.

Answer £ _____ [4]

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Examiner Only	
Marks	Remark

8 The interior angle of a regular polygon is 140°.
How many sides has this regular polygon?

Answer _____ [3]

---

9 Simplify

(a) $\frac{3a}{2} + \frac{2a}{3}$

Answer _____ [3]

(b) $\frac{(x+2)^2}{2(x+2)}$

Answer _____ [1]

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(Questions continue overleaf)

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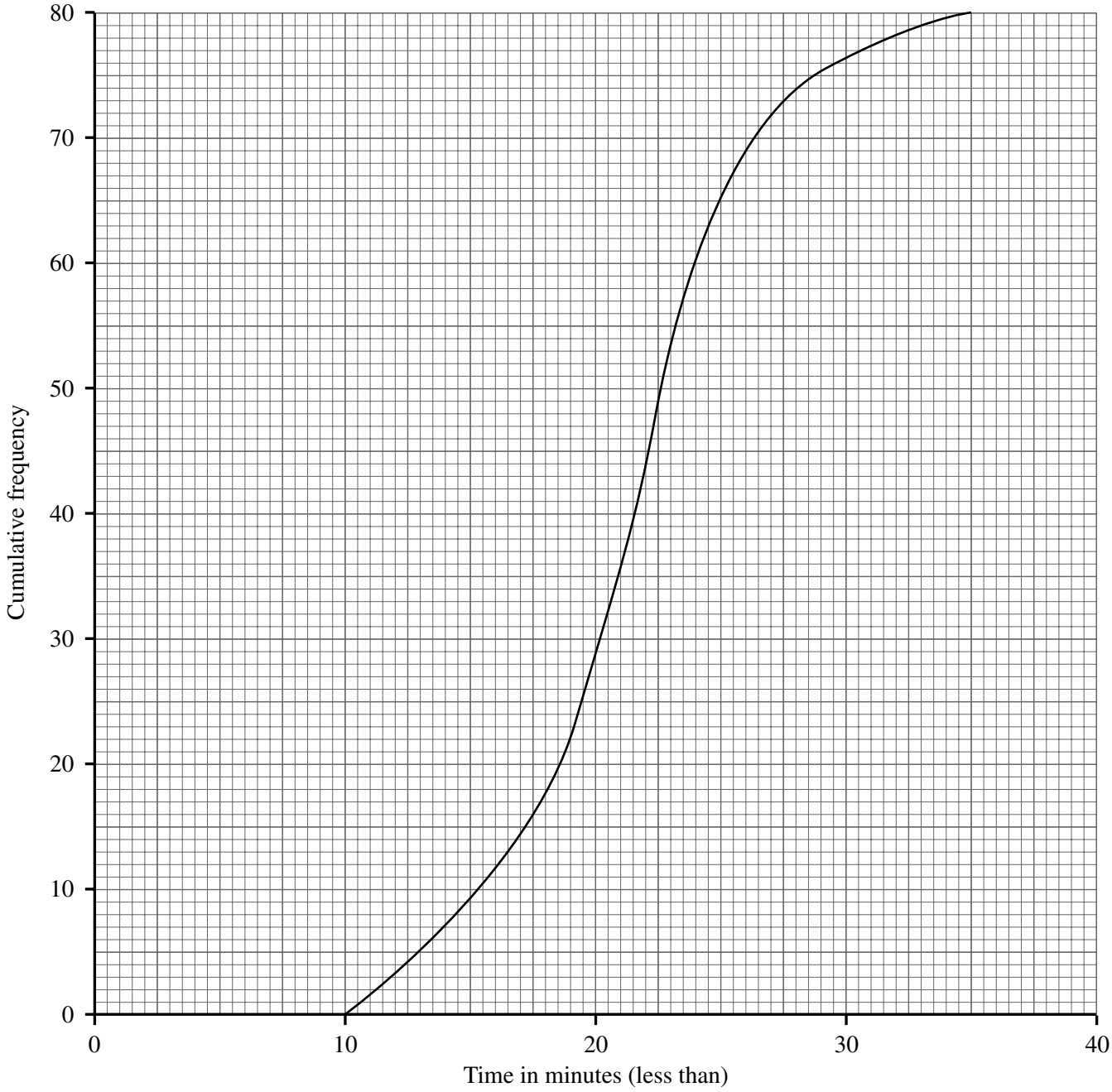
10 The time taken by a number of adults to complete a Sudoku puzzle was recorded.
The cumulative frequency graph for the results is shown.



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Use the graph to estimate

(a) the median time,

Answer _____ minutes [1]

(b) the interquartile range.

Answer _____ minutes [2]

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Marks	Remark

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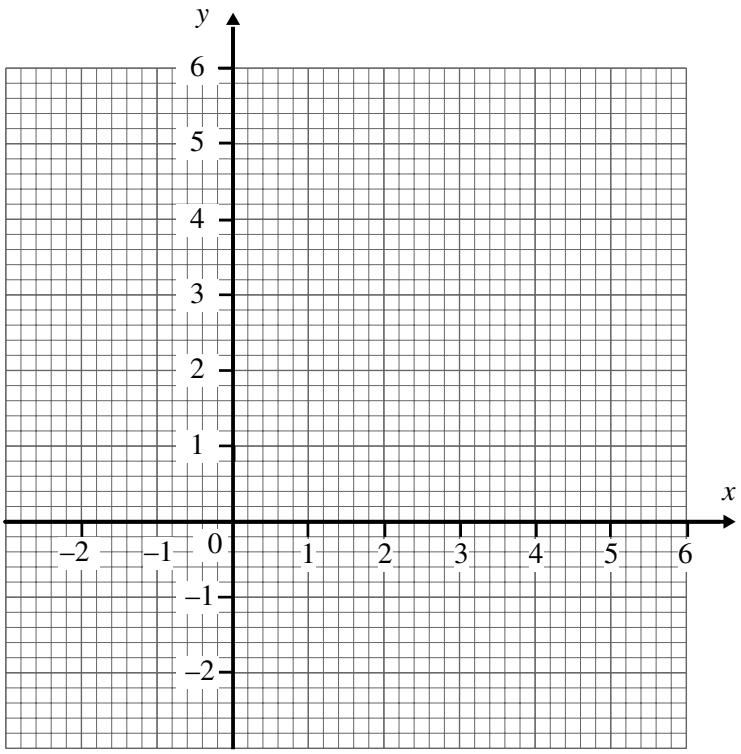
11 On the grid below, draw the lines $3x + 4y = 12$

$y = 3 - 3x$

and $y = -1$

Hence indicate clearly the region R where

$3x + 4y \leqslant 12$ $y \geqslant 3 - 3x$ and $y \geqslant -1$



[3]

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Marks	Remark

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12 A new HD ready TV was sold at the reduced price of £434 because the surround was slightly damaged.

30% of the original price had been deducted.
What was the original price?

Answer £ _____ [3]

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Marks	Remark

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Marks	Remark

13 A, B, C and D are points on the circumference of a circle with centre O.
Angle DAC = 20°

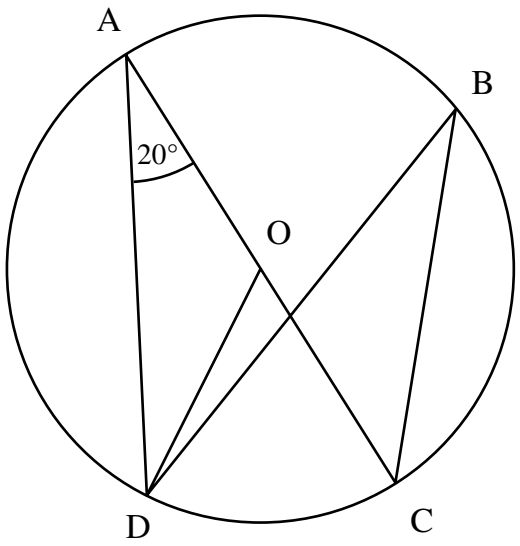

Diagram not drawn accurately

(a) Find the size of angles:

(i) DOC, Answer _____ ° [1]

(ii) ADC. Answer _____ ° [1]

(b) Explain why angle DBC = 20°

Answer _____ [1]

THIS IS THE END OF THE QUESTION PAPER

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