Rewarding Learning

| Centre Number | |
|---|---|
| 71 | |

| Candidate Number |
|---|
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General Certificate of Secondary Education
January 2010

# Mathematics

## Module N4 Paper 2
## (With calculator)
## Higher Tier

**[GMN42]**

**TUESDAY 12 JANUARY**

**10.30 am–11.30 am**

GMN42

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

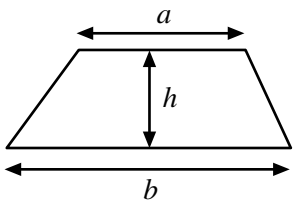
**INFORMATION FOR CANDIDATES**

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.

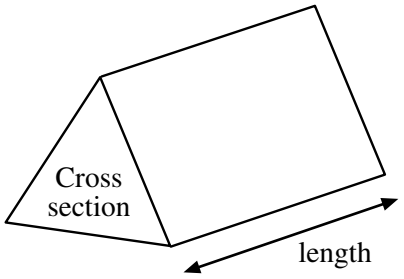
| For Examiner's use only | |
|---|---|
| **Question Number** | **Marks** |
| 1 | |
| 2 | |
| 3 | |
| 4 | |
| 5 | |
| 6 | |
| 7 | |
| 8 | |
| 9 | |
| 10 | |
| 11 | |
| **Total Marks** | |

# Formula Sheet

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




**Volume of prism** = area of cross section × length

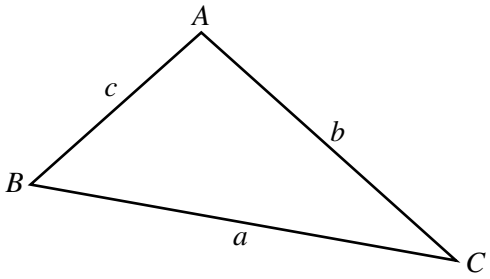



**In any triangle** $ABC$

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

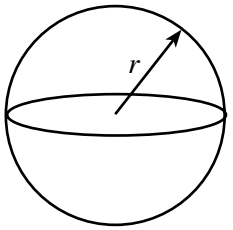
**Sine rule :** $\dfrac{a}{\sin A} = \dfrac{b}{\sin B} = \dfrac{c}{\sin C}$

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



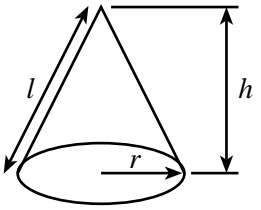

**Volume of sphere** = $\frac{4}{3}\pi r^3$

**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

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

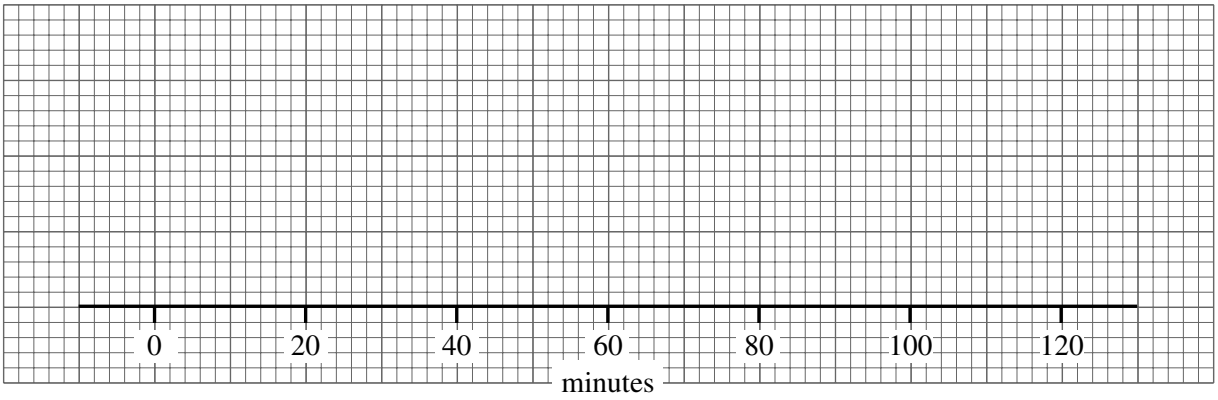
| Examiner Only | |
|---|---|
| Marks | Remark |
| | |

**1** A tennis club holds a Junior Tournament.
The time taken to complete each match is recorded.

**(a)** The statistical data for the girls' matches is:

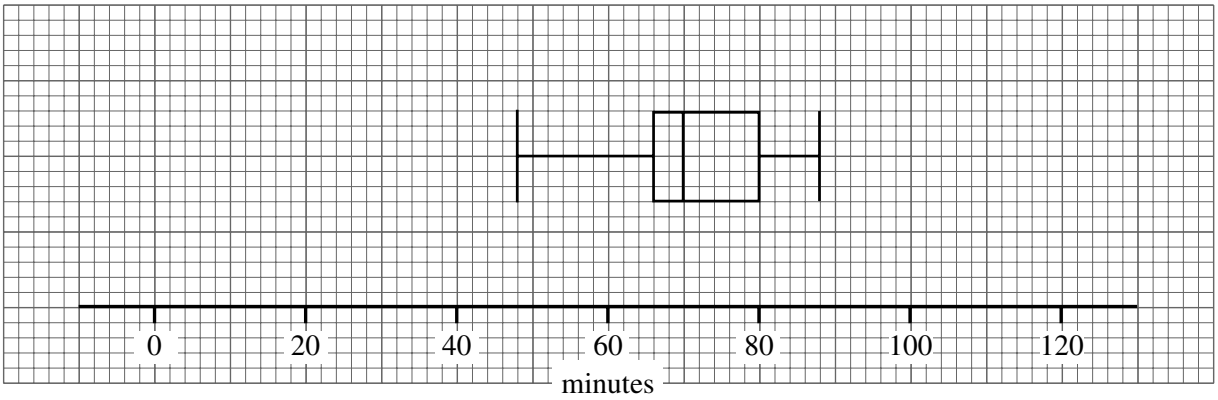
| | |
|---|---|
| Minimum time | 42 minutes |
| Maximum time | 104 minutes |
| Lower quartile | 68 minutes |
| Upper quartile | 90 minutes |
| Median time | 84 minutes |

Draw a box plot to illustrate this data.




[2]

**(b)** Similar data is recorded for the boys' matches and a box plot drawn.




Give **two** comments on the times taken to complete the girls' matches compared to the times taken to complete the boys' matches.

_____ [1]

_____ [1]

| Examiner Only | |
|---|---|
| Marks | Remark |

**2** St Elsewhere High School had an 8% absence rate on a particular day.

If there were 989 pupils present, how many pupils were absent?

Answer _____ [3]

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**3**

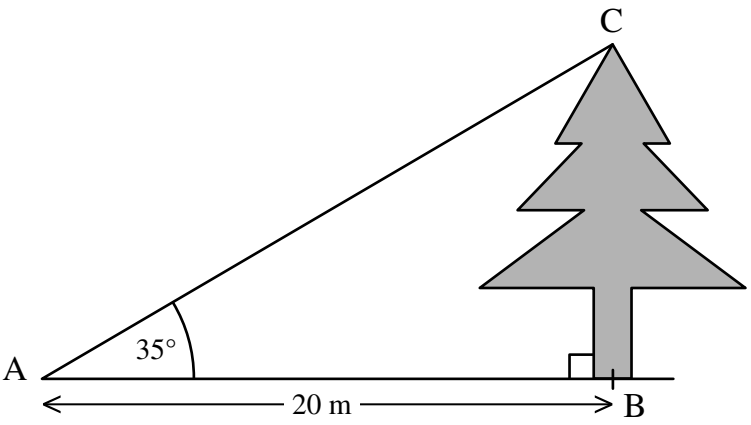


Diagram not drawn accurately

The angle of elevation from A to the top of the tree C is 35°
The distance AB = 20 m.

Calculate the height BC of the tree.

Answer _____ m [3]

**4** Find the volume of a spherical ball of radius 10 cm.

Answer _____ [3]

| Examiner Only | |
|---|---|
| Marks | Remark |
| | |

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**5** **(a)** Expand and simplify $(3x + 5)(4x - 2)$

Answer _____ [2]

**(b)** Factorise $x^2 - 3x - 40$

Answer _____ [2]

| Examiner Only | |
|---|---|
| Marks | Remark |

**6** Write down the equation of the straight line which passes through the point (0, –3) and is perpendicular to the line $y = 4x + 1$

Answer _____ [2]

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**7** Calculate the distance between the points with coordinates (3, 1, –4) and (7, 4, 8).

Answer _____ [2]

**8** **(a)** Solve the equation $6m^2 + 7m + 2 = 0$

Examiner Only

| Marks | Remark |
|---|---|
| | |

Answer _____ [3]

**(b)** Solve the following equation, giving your answers correct to two decimal places.

$$x^2 - 5x - 3 = 0$$

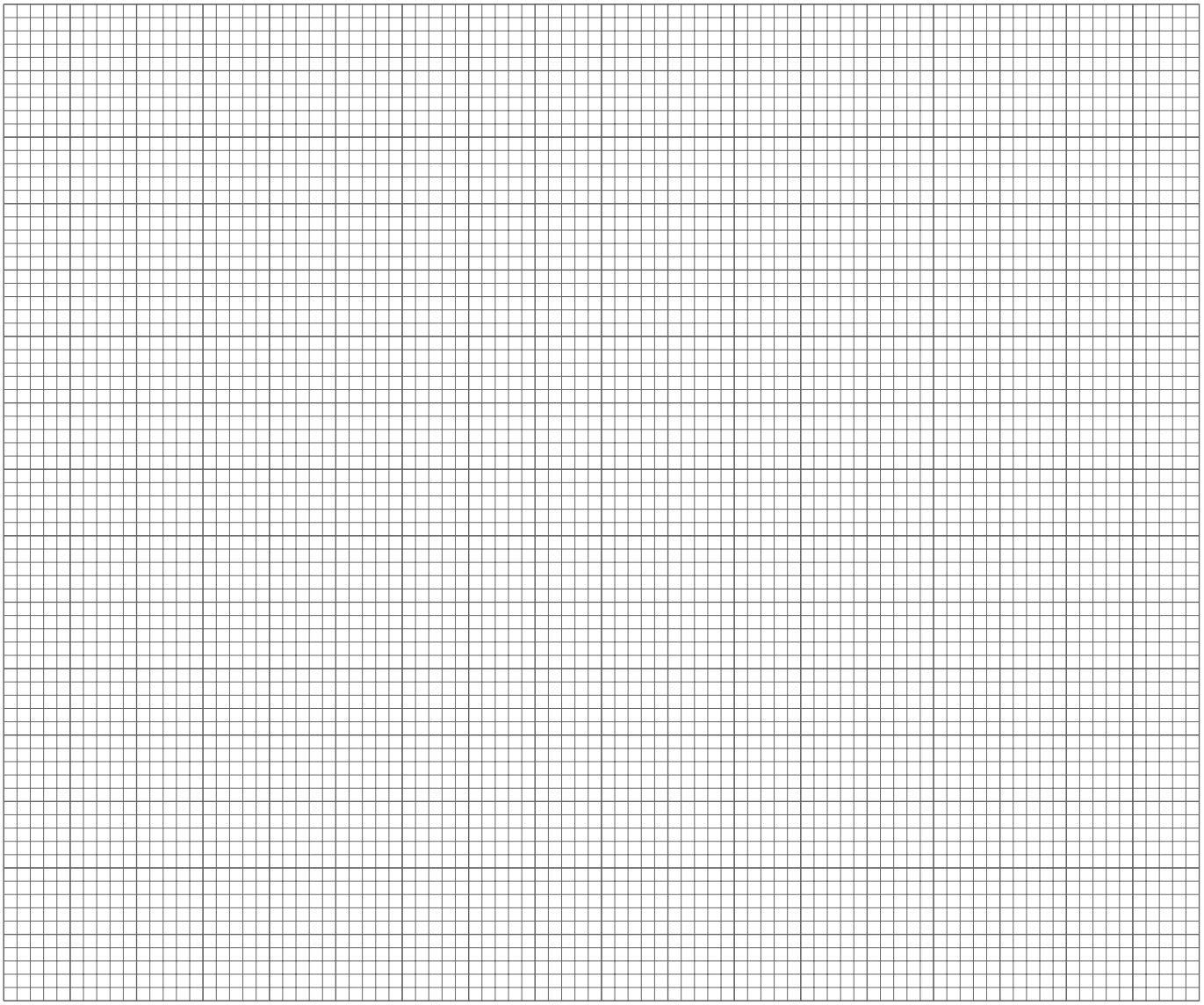
Answer _____ [3]

**9** The table shows the distribution of the heights of all sixth formers in a school.

| Examiner Only | |
|---|---|
| Marks | Remark |
| | |

| Height ($h$ cm) | Number of students |
|---|---|
| $150 \leqslant h < 165$ | 45 |
| $165 \leqslant h < 175$ | 75 |
| $175 \leqslant h < 180$ | 36 |
| $180 \leqslant h < 185$ | 66 |
| $185 \leqslant h < 195$ | 18 |

**(a)** Show this information on a histogram on the graph paper below. [3]



**(b)** Students at least $H$ cm tall are considered for the basketball team. A stratified sample of 40 students is selected from this group. Six of the stratified sample are at least 185 cm tall.

Calculate the value of $H$.

Answer $H$ = _____ [3]

| Examiner Only | |
|---|---|
| Marks | Remark |
| | |

**10**

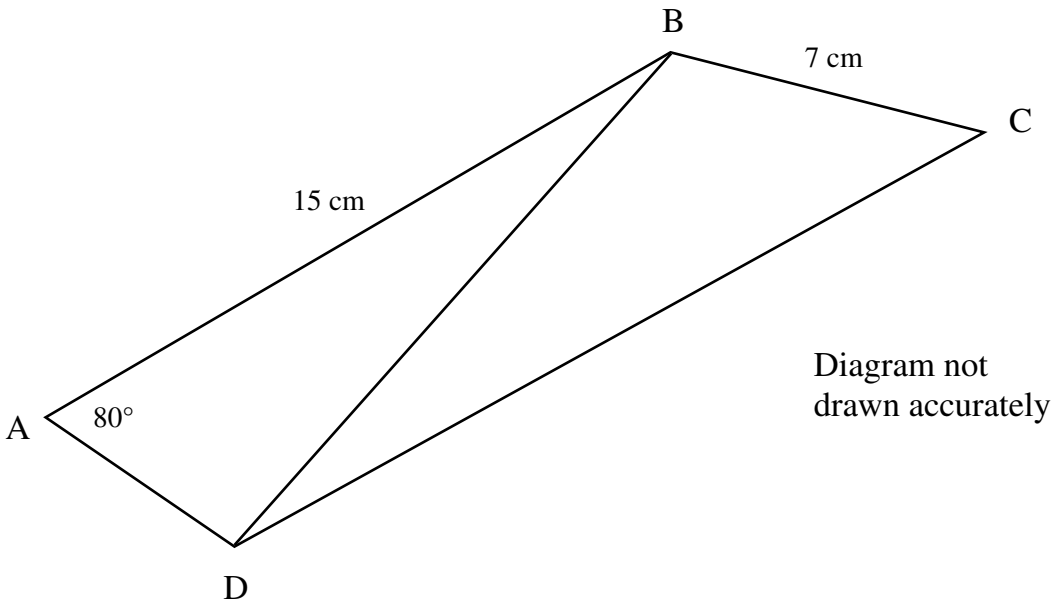



Diagram not drawn accurately

ABD is an isosceles triangle with angle A = 80° and AB = BD.
AB = 15 cm and BC = 7 cm. Angle ABC = 115°
Calculate the length of CD.

Answer _____ cm [4]

| Examiner Only | |
|---|---|
| Marks | Remark |
| | |

**11** Solve $\frac{1}{2x-3}+\frac{4}{x+1}=1$

| Examiner Only | |
|---|---|
| Marks | Remark |
| | |

**A solution by trial and improvement will not be accepted.**

Answer _____ [7]

**THIS IS THE END OF THE QUESTION PAPER**