

Rewarding Learning

## General Certificate of Secondary Education

 January 2010
## Mathematics



Module N3 Paper 2
(With calculator)
Higher Tier
[GMN32]
TUESDAY 12 JANUARY
10.30 am - 11.30 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.

## 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 <br> use only |  |
| :---: | :---: |
| Question <br> Number | Marks |
| 1 |  |
| 2 |  |
| 3 |  |
| 4 |  |
| 5 |  |
| 6 |  |
| 7 |  |
| 8 |  |
| 9 |  |
| 10 |  |
| 11 |  |
| 12 |  |
| 13 |  |
| Total <br> Marks |  |

## Formula Sheet

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


Volume of prism $=$ area of cross section $\times$ length


## In any triangle $A B C$

Area of triangle $=\frac{1}{2} a b \sin C$
Sine rule: $\quad \frac{a}{\sin A}=\frac{b}{\sin B}=\frac{c}{\sin C}$
Cosine rule: $a^{2}=b^{2}+c^{2}-2 b c \cos A$


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 $a x^{2}+b x+c=0$, where $a \neq 0$, are given by
$x=\frac{-b \pm \sqrt{b^{2}-4 a c}}{2 a}$

1 Calculate $\frac{4.3 \times 3.9}{7.8-1.9}$ correct to one decimal place.

2 (a) Draw the graph of $y=2 x-3$ on the grid below.

(b) Factorise $6+10 x$

Answer $\qquad$ [1]

3 Penny recorded the play time of each of the tracks on her iPod. The results are recorded in the table below.

| Time <br> $(\mathrm{t}$ seconds) | $90<\mathrm{t} \leqslant 120$ | $120<\mathrm{t} \leqslant 150$ | $150<\mathrm{t} \leqslant 180$ | $180<\mathrm{t} \leqslant 210$ | $210<\mathrm{t} \leqslant 240$ |
| :--- | :---: | :---: | :---: | :---: | :---: |
| Frequency | 22 | 35 | 18 | 10 | 6 |

(a) Show this information on a grouped frequency diagram.

(b) What is the modal class interval?
$\qquad$


4 (a) Change $4.6 \mathrm{~m}^{2}$ into $\mathrm{cm}^{2}$.
$\qquad$ $\mathrm{cm}^{2}$ [2]
(b)


G is the point $(-2,4) . \mathrm{H}$ is the point $(8,-2)$.
Find the co-ordinates of the midpoint of GH.

Answer ( $\qquad$ , $\qquad$ ) [2]

5 The lines PQ and RS are parallel.
Write down the size of angles $a$ and $b$.


Diagram not drawn accurately

Answer $a=$ $\qquad$ $\circ$

$$
\begin{equation*}
b= \tag{}
\end{equation*}
$$

6


Calculate the perimeter of a semicircle with diameter 8 cm .

## Answer

$\qquad$ [4]

7 In September, Georgina received $£ 600$ commission on sales she had made that month.
In October she received $15 \%$ less than September.
In November her commission increased by $18 \%$ and in December by $25 \%$ on the previous month.
How much commission did Georgina receive in December?
Show all your working.

Answer £ $\qquad$ [3]

8 (a) The scatter graph shows the relationship between the ages of cars and their mileage.


Suggest a reason for the unusual point (circled).
Answer $\qquad$
$\qquad$
(b) (i) What type of correlation exists between the ages of cars and their value?

Answer $\qquad$ [1]
(ii) Sketch a scatter graph with at least six points to illustrate this correlation.

(c) Write down a variable for cars which would have no correlation to the ages of the cars.

Answer [1]

9 The size of the angles, in degrees, of the triangle below are $2 x, 2 x+19$ and $x+16$.

(a) Use the information to write down an equation in terms of $x$.

Answer
(b) Solve your equation to find the value of $x$.

Answer $x=$ ${ }^{\circ}$ [2]
$\qquad$

10 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.

(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.
$\qquad$
$\qquad$

11 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 $\qquad$

12


Diagram not drawn accurately

The angle of elevation from $A$ to the top of the tree C is $35^{\circ}$.
The distance $\mathrm{AB}=20 \mathrm{~m}$.

Calculate the height BC of the tree.

Answer $\qquad$ m [3]

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

Answer [2]
(b) Factorise $x^{2}-3 x-40$

Answer

## THIS IS THE END OF THE QUESTION PAPER

