Rewarding Learning

Centre Number	
71	

Candidate Number

General Certificate of Secondary Education
2009

Mathematics

Module N4 Paper 1
(Non-calculator)
Higher Tier

[GMN41]

MONDAY 18 MAY

1.30 pm – 2.30 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 eleven** 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.

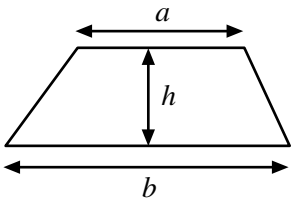
INFORMATION FOR CANDIDATES

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.

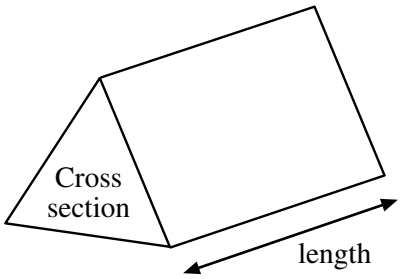
For Examiner's use only	
Question Number	**Marks**
1	
2	
3	
4	
5	
6	
7	
8	
9	
10	
11	
Total Marks	

Formula Sheet

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



Volume of prism = area of cross section × length

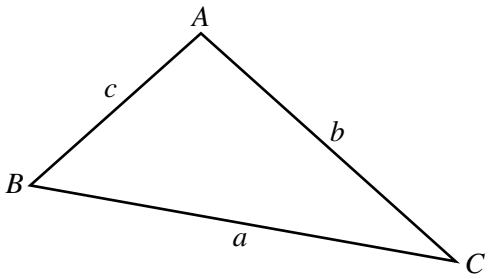


In any triangle ABC

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

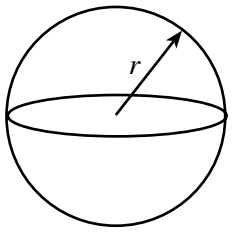
Sine rule : $\frac{a}{\sin A} = \frac{b}{\sin B} = \frac{c}{\sin C}$

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



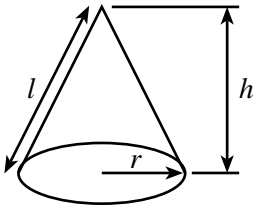
Volume of sphere = $\frac{4}{3}\pi r^3$

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



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

Curved surface area of cone = πrl



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)** Expand and simplify $(3x - 2)(2x + 1)$

Answer _____ [2]

(b) Solve the simultaneous equations

$$3x - 2y = 14$$
$$x + 2y = 10$$

Show your working.
A solution by trial and improvement will not be accepted.

Answer x = _____, y = _____ [2]

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2 Calculate $2\frac{1}{5} \div 1\frac{2}{3}$

Answer _____ [3]

---

3 Solve the equation $\frac{2x + 1}{3} - \frac{x + 1}{5} = 3$

Show your working.
A solution by trial and improvement will not be accepted.

Answer x = _____ [4]

[Turn over

Examiner Only	
Marks	Remark

4 A glacier is losing 20% of its volume each year.
What % of its original volume will be left after 3 years?

Answer _____ % [2]

5

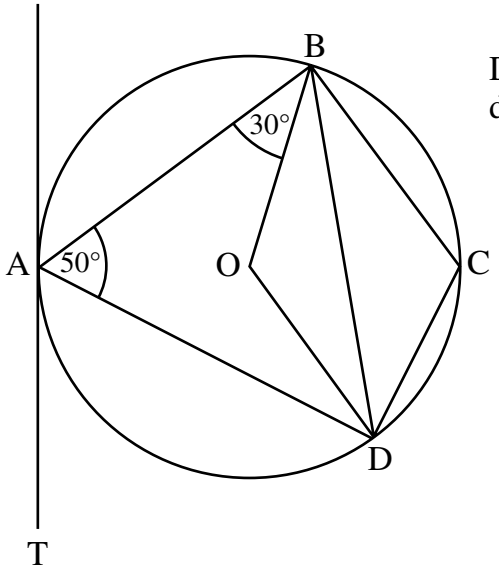

Diagram not drawn accurately

O is the centre of a circle and A, B, C and D are points on the circumference of the circle.
TA is a tangent to the circle.
Angle BAD is 50°. Angle ABO is 30°.
Calculate the size of

(a) angle OAT,

Answer _____° [1]

(b) angle BCD,

Answer _____° [1]

(c) angle BOD,

Answer _____° [1]

(d) angle TAD.

Answer _____° [2]

Examiner Only	
Marks	Remark

6 **(a)** Factorise $x^2 - 4$

Answer _____ [1]

(b) Hence simplify $\dfrac{x^2 - 4}{2x^2 - x - 6}$

Answer _____ [3]

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7 Which of the three measures of central tendency ("average") would be of most use to a shoe shop manager when placing an order for more shoes? Give a reason for your answer.

Answer _____ because _____

_____ [2]

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8 Write down the equation of the straight line which passes through the point (0, 2) and is perpendicular to the line with equation $y = 3x$.

Answer _____ [2]

---

9 Evaluate

(a) $9^{\frac{3}{2}}$

Answer _____ [2]

(b) $81^{-\frac{1}{2}}$

Answer _____ [2]

10 The table gives information about the weights of schoolbags.

Weight, w kg	Number of schoolbags
$2.0 \leqslant w < 3.0$	18
$3.0 \leqslant w < 3.5$	28
$3.5 \leqslant w < 4.0$	34
$4.0 \leqslant w < 6.0$	16
$6.0 \leqslant w < 6.5$	4

(a) Illustrate the data by drawing a histogram on the graph paper opposite, using the scale provided. [3]

(b) A stratified sample of 20 schoolbags was taken from those whose weight was less than 4.0 kg.

(i) How many of the sample were taken from the class interval $3.0 \leqslant w < 3.5$?

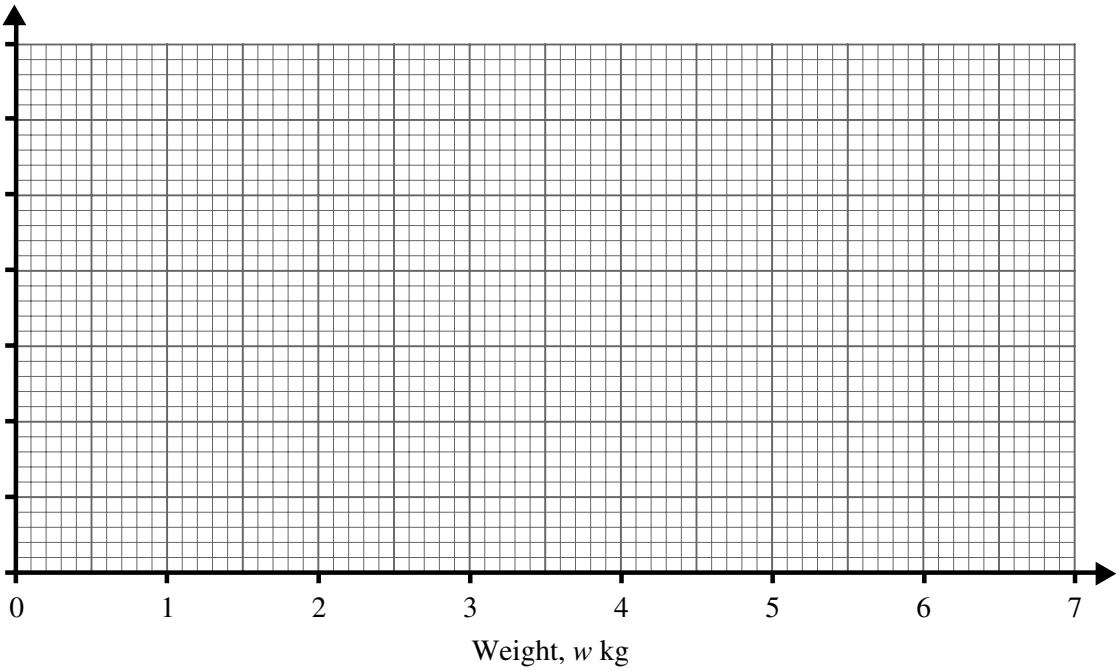
Answer _____ [2]

(ii) In this stratified sample, half the schoolbags weighed less than 3.2 kg. Estimate how many of the original full set of schoolbags weighed 3.2 kg or more.

Answer _____ [2]

Examiner Only

Marks	Remark



Examiner Only	
Marks	Remark

11 Solve the simultaneous equations $y = x^2 + 3x - 2$ and $3x + 2y = 22$.

Answer _____ [7]