Rewarding Learning

Centre Number

71	

Candidate Number

General Certificate of Secondary Education
2011

Mathematics

Module N3 Paper 1
(Non-calculator)
Higher Tier

[GMN31]

TUESDAY 31 MAY

9.15 am–10.15 am

GMN31

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.

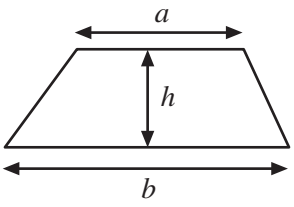
INFORMATION FOR CANDIDATES

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.

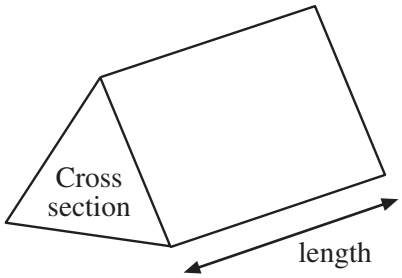
For Examiner's use only	
Question Number	Marks
1	
2	
3	
4	
5	
6	
7	
8	
9	
10	
11	
12	
13	
Total Marks	

Formula Sheet

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



Volume of prism = area of cross section × length

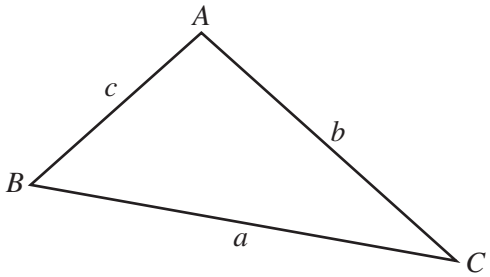


In any triangle ABC

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

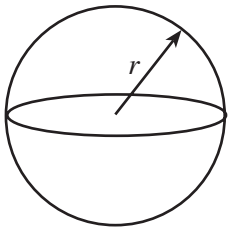
Sine rule : $\frac{a}{\sin A} = \frac{b}{\sin B} = \frac{c}{\sin C}$

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



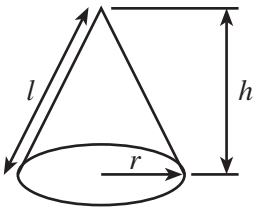
Volume of sphere $= \frac{4}{3}\pi r^3$

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



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

Curved surface area of cone $= \pi rl$



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)** Lines AB, CD and EF are parallel.

Angles of 96° and 60° are marked in the diagram as shown.

Calculate the size of the angles marked x, y and z.

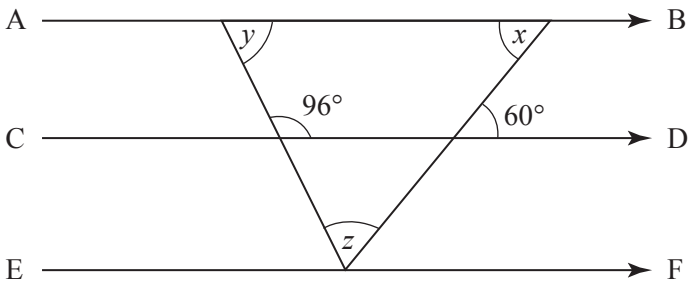


diagram not drawn accurately

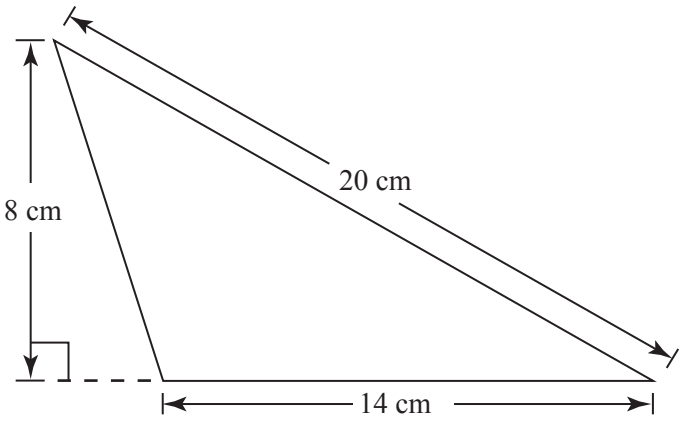
Answer Angle x = _____° [1]

Angle y = _____° [1]

Angle z = _____° [1]

(b) This triangle has some lengths marked on it.

Calculate the area of the triangle.



Answer _____ cm^2 [2]

Examiner Only	
Marks	Remark

2 The Ross family eat $\frac{3}{5}$ of a loaf of bread each day.

What is the least number of loaves they will need to buy for 9 days?

Answer _____ [3]

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3 Julie is a pupil at Northwood Girls Comprehensive and she wants to know how many times a month, on average, the people in her town go to the swimming pool. She asks 500 pupils in her school.

Give **two** reasons why Julie's sample may not be representative of the people in her town.

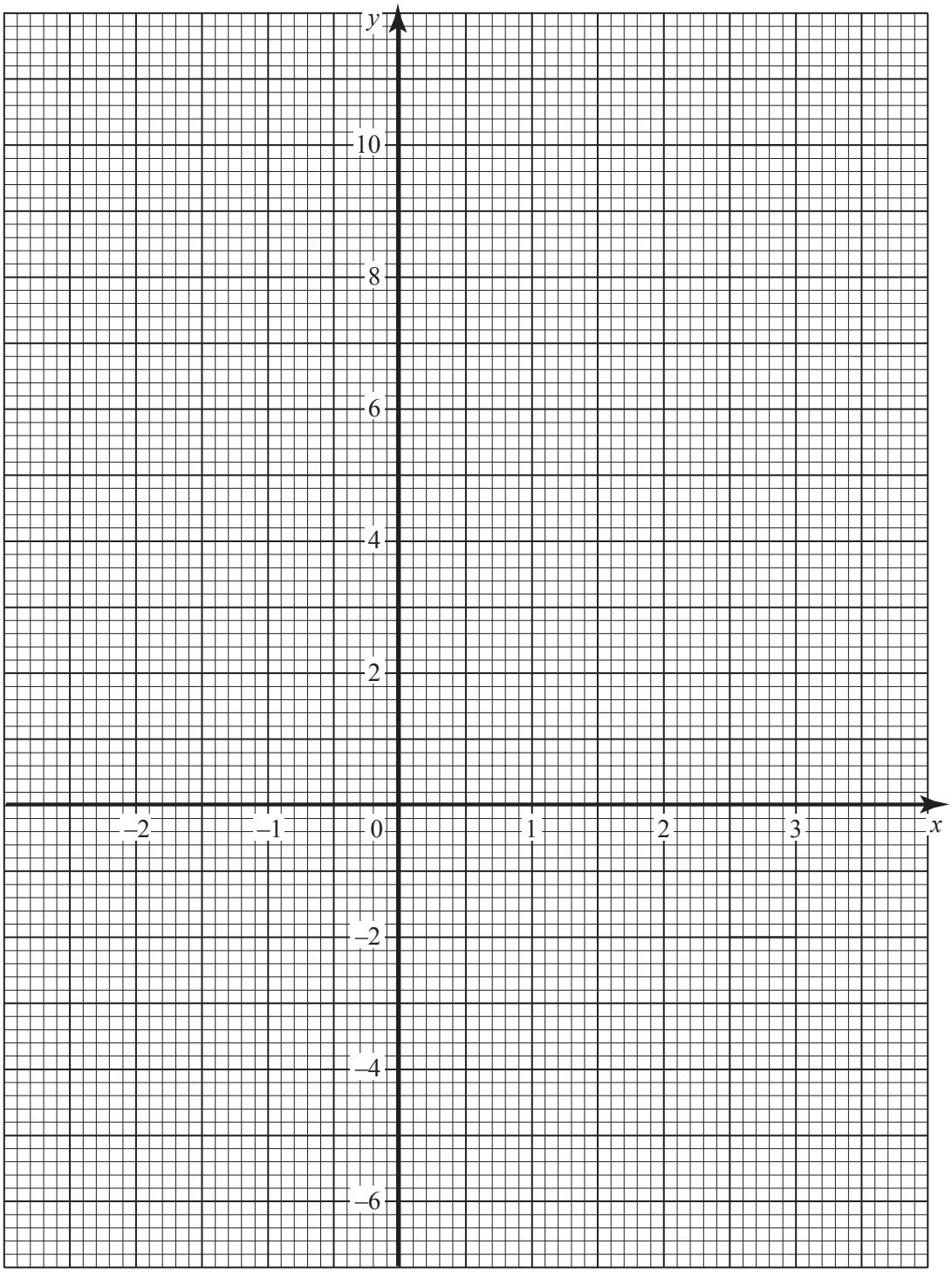
Reason 1 _____

_____ [1]

Reason 2 _____

_____ [1]

4 Draw the graph of $y = 4 - 3x$ on the graph paper below.



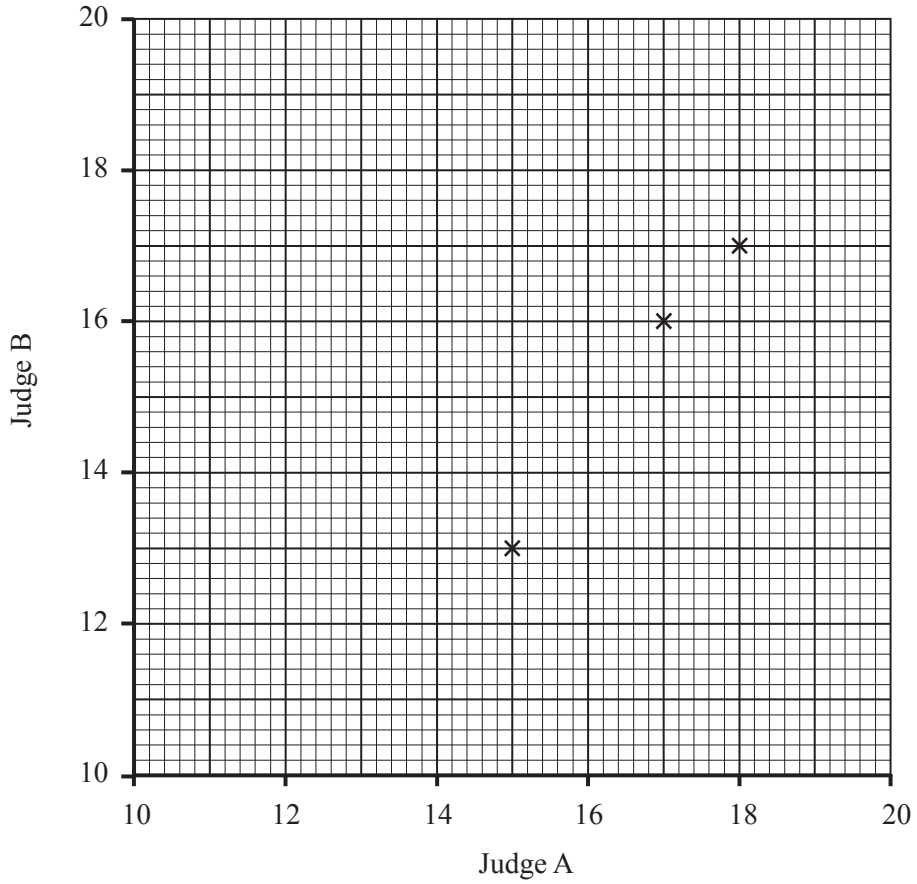
[3]

Examiner Only

Marks	Remark

5 The table shows the marks awarded by two judges to the first eight competitors in a gymnastics competition.

Judge A	**18**	**15**	**17**	13	19	15	12	18
Judge B	**17**	**13**	**16**	13	18	16	14	16



(a) The first three points have already been plotted.

Use the data to complete the scatter graph. [2]

(b) Draw the line of best fit. [1]

(c) Another competitor was awarded 14 marks by Judge A.

Estimate the marks awarded to this competitor by Judge B.

Answer _____ [1]

Examiner Only

Marks	Remark

Examiner Only	
Marks	Remark

6 **(a)** Find the midpoint of the line joining the points A (–1, 6) and B (3, –2).

Answer (_____ , _____) [2]

(b) The point M (4, 1) is the midpoint of the line joining the points C and D. C is the point (1, –1).

Find the coordinates of the point D.

Answer (_____ , _____) [2]

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7 Write 84 as a product of prime factors.

Express your answer in index notation.

Answer _____ [3]

Examiner Only	
Marks	Remark

8 **(a)** Expand and simplify

$$(x - 6)(x + 4)$$

Answer _____ [2]

(b) Write down the nth term for the sequence 4, 8, 12, 16, ...

Answer _____ [1]

9 The times that 100 students spent watching TV during one weekend were recorded. The times were grouped as shown in the table.

Time t (hours)	**Frequency**		
$0 < t \leq 2$	4		
$2 < t \leq 4$	18		
$4 < t \leq 6$	32		
$6 < t \leq 8$	20		
$8 < t \leq 10$	16		
$10 < t \leq 12$	10		

Calculate an estimate for the mean time.

Answer _____ hours [4]

Examiner Only	
Marks	Remark

10 Solve the equation $\frac{2x-4}{5}+\frac{x+11}{2}=2$

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

Answer $x =$ _____ [4]

11

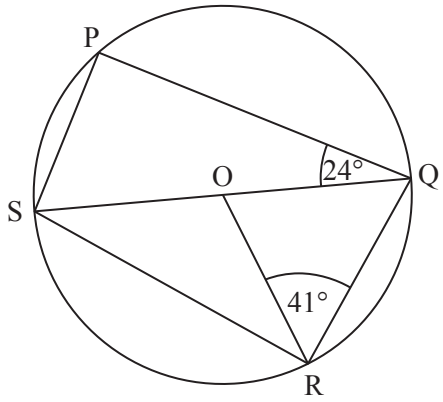

diagram not drawn accurately

In the diagram O is the centre of the circle. SOQ is a straight line.
Angle ORQ = 41° and angle PQS = 24°.

Find the size of the following angles:

(a) OQR = _____ ° [1]

(b) PSQ = _____ ° [1]

(c) PSR = _____ ° [1]

Examiner Only	
Marks	Remark

Examiner Only	
Marks	Remark

12 Calculate $2\frac{1}{3} \div 1\frac{1}{4}$

Give your answer as a mixed number.

Answer = _____ [3]

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13 **(a)** Factorise $x^2 + x - 6$

Answer _____ [2]

(b) Hence solve the equation $x^2 + x - 6 = 0$

Answer x = _____ [1]

THIS IS THE END OF THE QUESTION PAPER