



Rewarding Learning

General Certificate of Secondary Education
January 2009

Mathematics



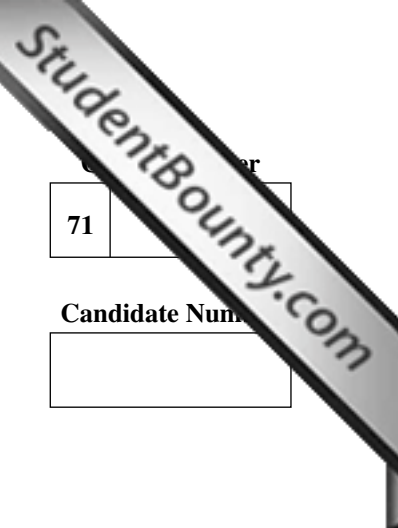
Module N3 Paper 2
(With calculator)
Higher Tier

[GMN32]

FRIDAY 9 JANUARY
10.30 am – 11.30 am



GMN32



71	
Candidate Number	
<input type="text"/>	

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.

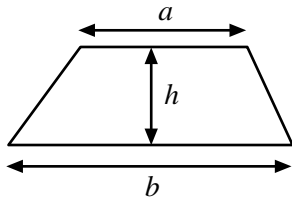
The Formula Sheet is on page 2.

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

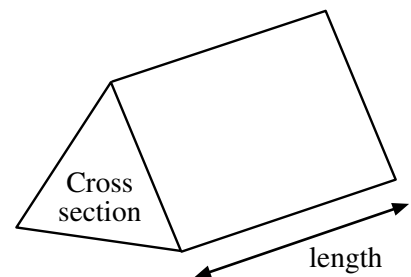
Total Marks	
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Formula Sheet

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



Volume of prism = area of cross section \times length

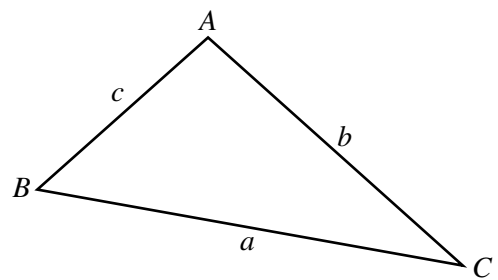


In any triangle ABC

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

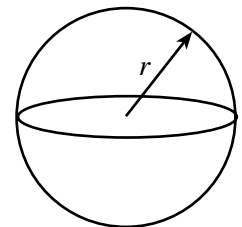
Sine rule: $\frac{a}{\sin A} = \frac{b}{\sin B} = \frac{c}{\sin C}$

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



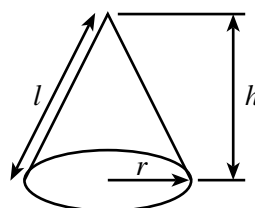
Volume of sphere = $\frac{4}{3}\pi r^3$

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



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

Curved surface area of cone = $\pi r l$



Quadratic equation:

The solutions of $ax^2 + bx + c = 0$, where $a \neq 0$, are given by

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

1 Calculate the area of a circle of radius 2.5 cm.

Answer _____ [3]

2 A new table is priced at £140
In a sale it is reduced by 35%
Calculate the sale price.

Answer £ _____ [3]

Examiner Only	
Marks	Remark

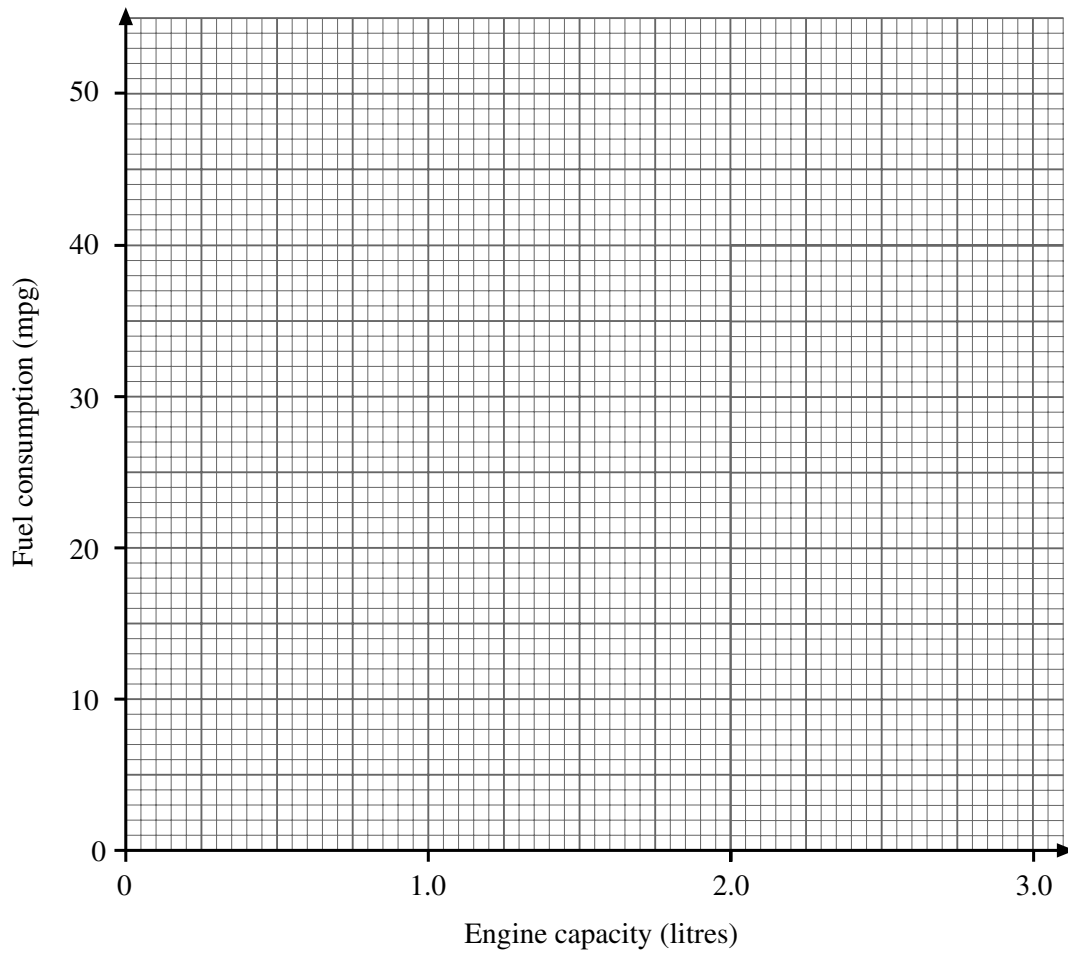
- 3 The table shows the engine capacity in litres and the fuel consumption (number of miles per gallon (mpg)) for a selection of new cars.

Car	Engine capacity (litres)	Fuel consumption (mpg)
Aster	1.3	45
Viva	2.0	37
Megro	2.5	32
Lazio	1.6	42
Torino	1.8	39
Serene	1.0	50

- (a) Draw a scatter graph on the grid opposite to show the data in the table. [2]
- (b) Draw a line of best fit for the data. [1]
- (c) Using your line of best fit, what fuel consumption in mpg would you expect from a car with an engine capacity of 2.2 litres?

Answer _____ mpg [1]

Examiner Only	
Marks	Remark



4 (a)

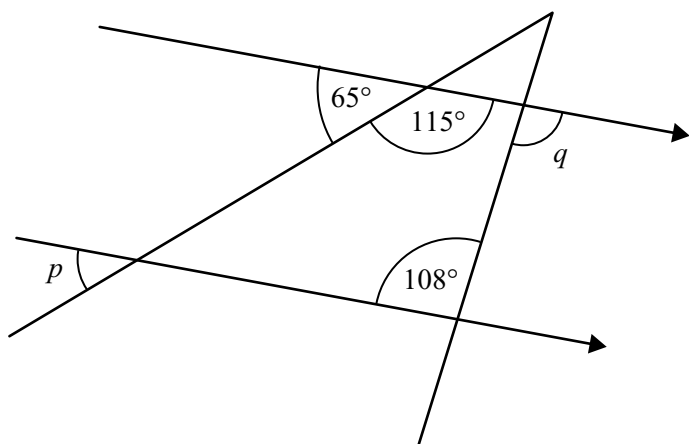


Diagram not drawn accurately

Calculate

(i) angle p

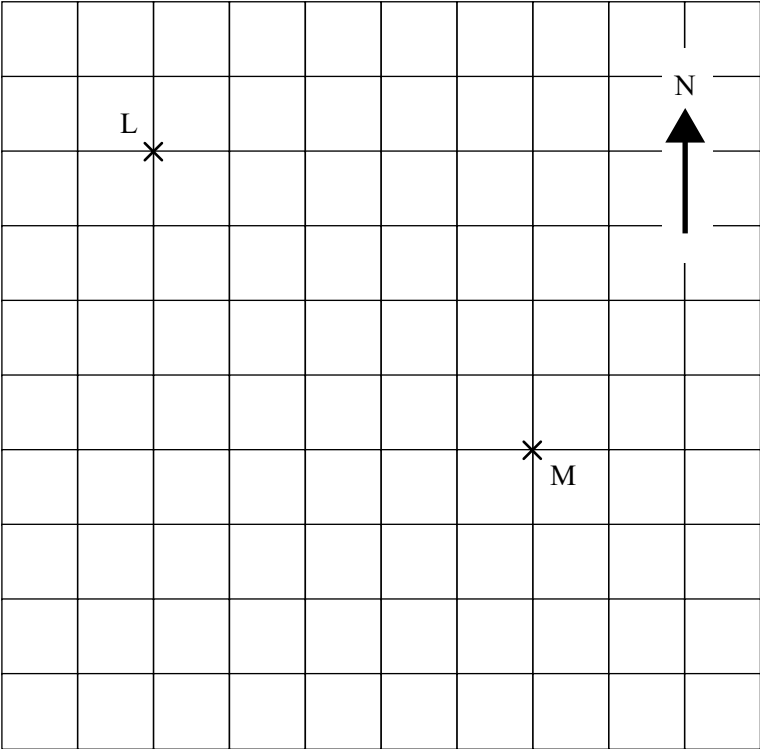
Answer _____ $^\circ$ [1]

(ii) angle q

Answer _____ $^\circ$ [1]

Examiner Only	
Marks	Remark

(b) Measure the bearing of L from M.



Answer _____° [1]

Examiner Only	
Marks	Remark

Examiner Only	
Marks	Remark

5 In a game of Foozball a player scores 2 'Goals' worth x points each, 3 'Overs' worth y points each and 1 'Nearly' worth z points.

(a) Write down an expression in terms of x , y and z for the total number of points scored by this player.

Answer _____ [2]

(b) If the total points scored by this player were 19, how many points could each of the 3 scores have been worth?
Give **one** possible solution.

Points

1 Goal = _____

1 Over = _____

1 Nearly = _____ [2]

6 Ciara is using Trial and Improvement to find a value of x to satisfy the equation

$$x + \frac{1}{x} = 6$$

The table shows her first trial.

Value of x	$x + \frac{1}{x}$	Comment
2	2.5	Too Low

Complete the table to help her find the correct value of x to 1 decimal place.

Answer $x =$ _____ [4]

- 7 Carol leaves £1200 in the bank for three years.
It earns compound interest of 6% each year.

Calculate the total amount Carol has in the bank at the end of the three years.

Answer £ _____ [3]

- 8 The PSNI recorded the speeds of a number of vehicles passing under a bridge on the M2 motorway during a 2 minute period one morning.
The speeds recorded are in miles per hour (mph).

Speed s (mph)	Frequency		
$44 \leq s < 50$	3		
$50 \leq s < 56$	7		
$56 \leq s < 62$	8		
$62 \leq s < 68$	6		
$68 \leq s < 74$	5		
$74 \leq s < 80$	1		

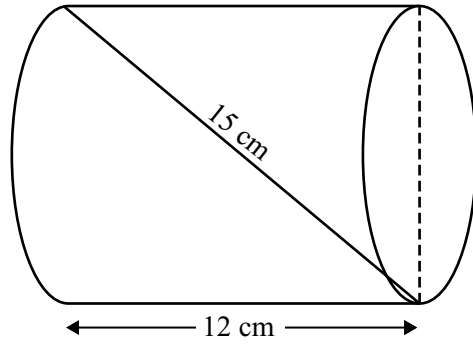
Calculate an estimate for the mean speed.

Answer _____ mph [4]

Examiner Only

Marks Remark

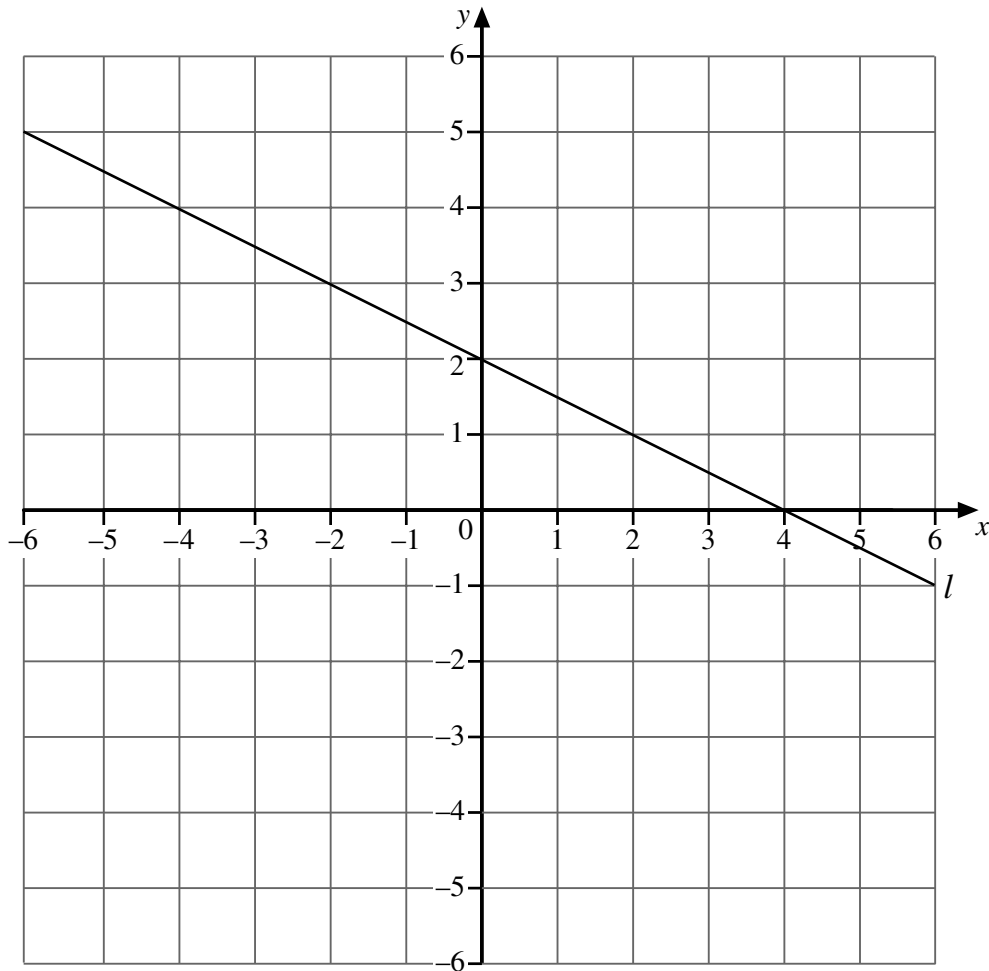
9



A straw of length 15 cm just fits inside a cylindrical container of length 12 cm as shown. Calculate the diameter of the cylinder.

Answer _____ cm [3]

Examiner Only	
Marks	Remark



(a) (i) Find the gradient of the line l Answer _____ [1]

(ii) Hence write down the equation of this line in the form $y = mx + c$.

Answer _____ [2]

(b) Here are the equations of another 4 lines

Line 1: $y = 2x$

Line 2: $y = -2$

Line 3: $y = x - 3$

Line 4: $y = 2x - 2$

Which one of these lines is parallel to the line with equation $y = x - 2$?

Answer _____ [1]

Examiner Only	
Marks	Remark

11 A coat has a sale price of £54.40 which is a saving of 15% on the original price.

What was the original price of the coat?

Answer £ _____ [3]

Examiner Only	
Marks	Remark

12 The diagram shows a trapezium.

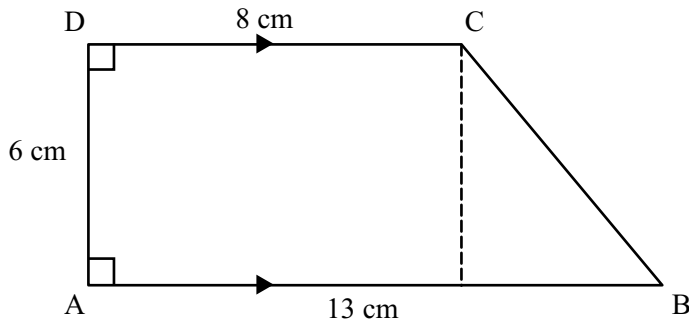


Diagram not drawn accurately

AB is parallel to DC. $AB = 13$ cm, $AD = 6$ cm and $CD = 8$ cm.

Calculate the size of angle B.

Answer _____° [3]

Examiner Only	
Marks	Remark

13

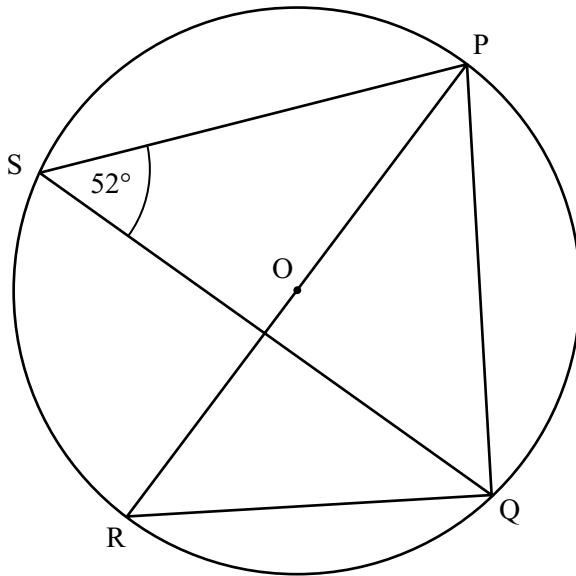


Diagram not
drawn accurately

O is the centre of the circle.

(a) Explain why angle $PQR = 90^\circ$

_____ [1]

(b) Calculate

(i) angle PRQ,

Answer _____ $^\circ$ [1]

(ii) angle POQ.

Answer _____ $^\circ$ [1]

Examiner Only	
Marks	Remark

THIS IS THE END OF THE QUESTION PAPER
