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General Certificate of Secondary Education
2009

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71	
Candidate Number	
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Mathematics

Module N3 Paper 1
(Non-calculator)
 Higher Tier
 [GMN31]



GMN31

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 fourteen** 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.

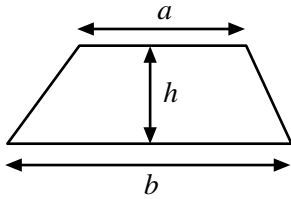
For Examiner's use only

Question Number	Marks
1	
2	
3	
4	
5	
6	
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8	
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11	
12	
13	
14	

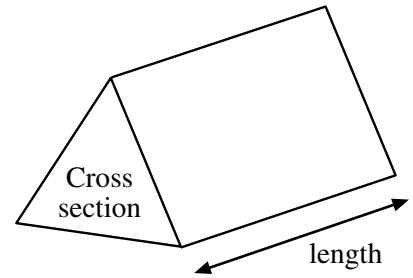
Total Marks	
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Formula Sheet

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



Volume of prism = area of cross section \times length

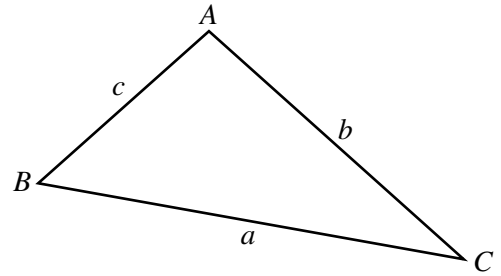


In any triangle ABC

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

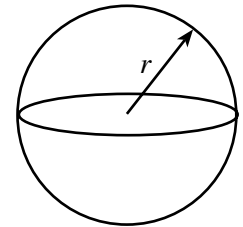
Sine rule: $\frac{a}{\sin A} = \frac{b}{\sin B} = \frac{c}{\sin C}$

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



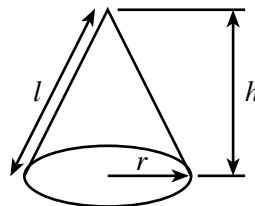
Volume of sphere = $\frac{4}{3}\pi r^3$

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

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

- 2 On holiday Mark drinks $\frac{3}{4}$ of a bottle of water each day.
What is the least number of bottles Mark will have to buy for a 9 day holiday?

Answer _____ [3]

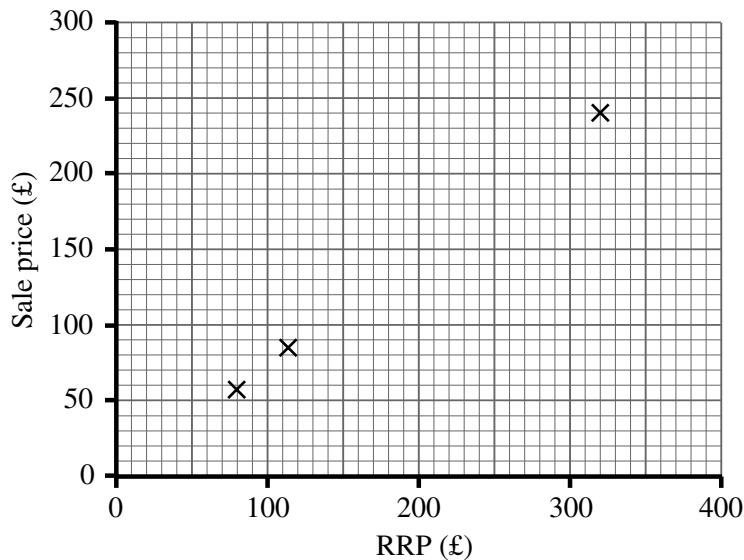
- 3 I buy y bars of chocolate at 42 pence each.
Write an expression in terms of y for the change, in **pence**, I will get from £5.

Answer _____ p [2]

Examiner Only	
Marks	Remark

- 4 The table shows the RRP (recommended retail price) and the sale price of some products in Jack's Discount Store.

RRP (£)	80	113	140	170	180	210	230	270	300	320
Sale price (£)	58	85	105	130	132	155	178	200	232	240



The data in bold type has already been plotted.

- (a) Complete the scatter graph. [2]

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

- (c) Estimate the RRP of a product on sale for £150

Answer £ _____ [1]

- (d) What type of correlation does your graph show?

Answer _____ [1]

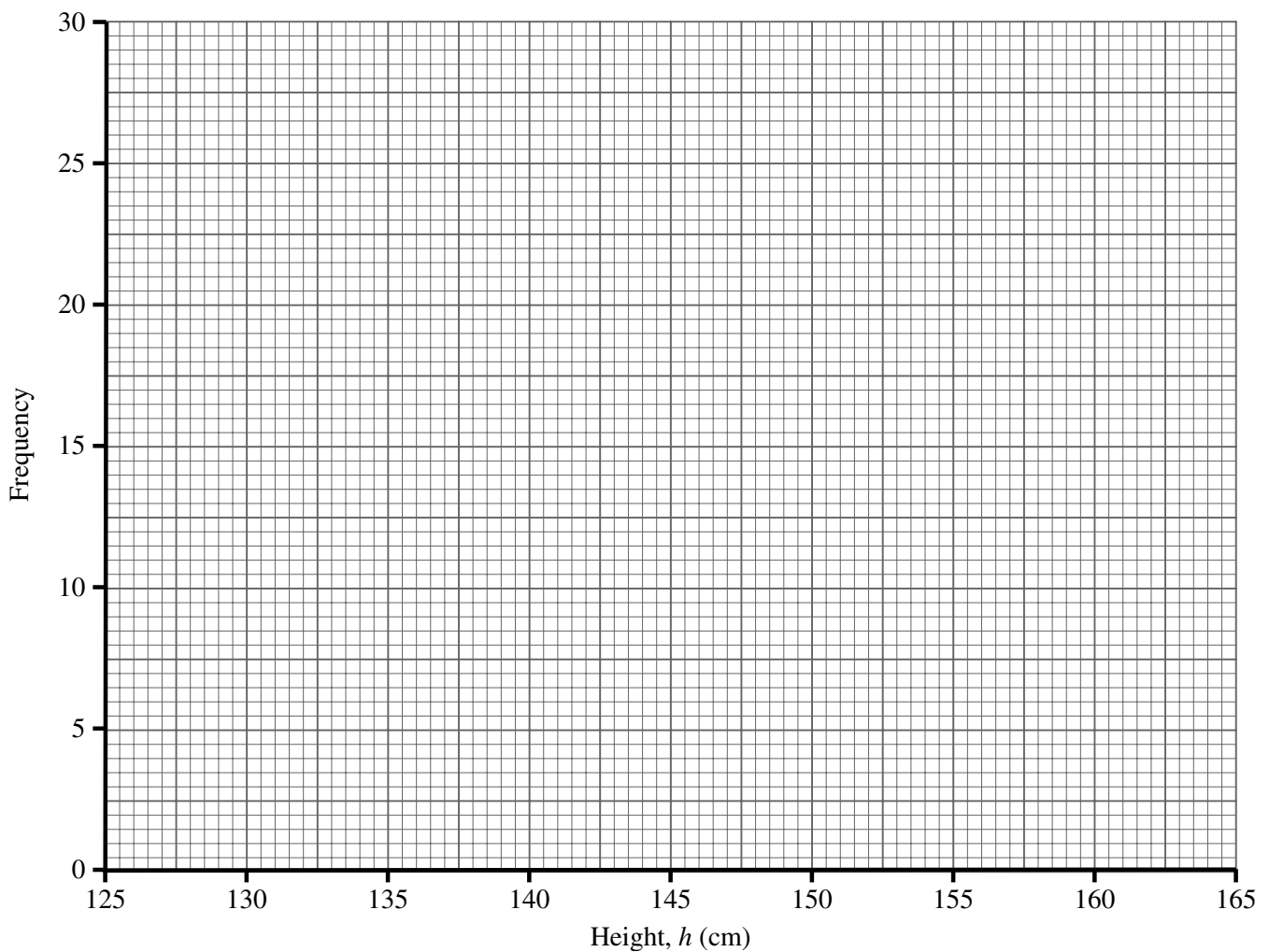
Examiner Only	
Marks	Remark

7 The heights of 100 students were recorded.

Height, h , in cm	Frequency
$130 \leq h < 135$	15
$135 \leq h < 140$	25
$140 \leq h < 145$	26
$145 \leq h < 150$	21
$150 \leq h < 155$	8
$155 \leq h < 160$	5

Examiner Only	
Marks	Remark

Draw a frequency polygon for the data.



[2]

Examiner Only	
Marks	Remark

- 8 Write 80 as a product of its prime factors, giving your answer in index form.

Examiner Only

Marks Remark

Answer _____ [3]

- 9 Jack is x years old. His brother Dan is 5 years younger.
In 3 years' time the sum of their ages will be 15.

- (a) Write an equation in terms of x using the sum of their ages in 3 years' time.

Answer _____ [2]

- (b) Solve the equation to find Jack's age now.

Answer _____ [1]

12

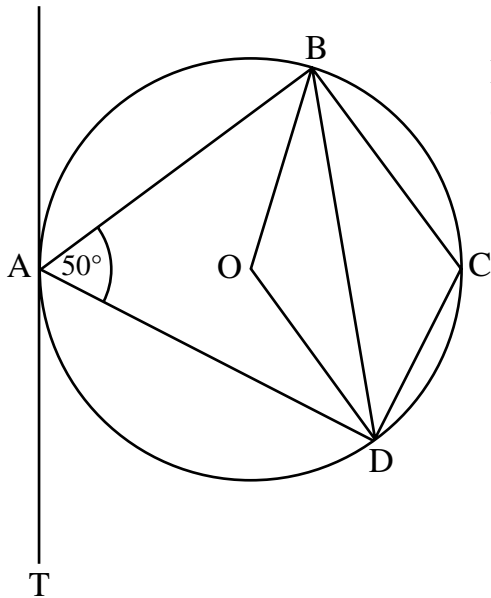


Diagram not drawn accurately

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°

Calculate the size of

(a) angle OAT,

Answer _____ $^\circ$ [1]

(b) angle BCD,

Answer _____ $^\circ$ [1]

(c) angle BOD.

Answer _____ $^\circ$ [1]

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

Answer _____ [3]

Examiner Only	
Marks	Remark

14 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.

Examiner Only	
Marks	Remark

Answer $x =$ _____ [4]

THIS IS THE END OF THE QUESTION PAPER
