

GENERAL CERTIFICATE OF SECONDARY EDUCATION
MATHEMATICS B (MEI)
PAPER 1 SECTION A

H

B263A

HIGHER TIER

Afternoon

MONDAY 4 JUNE 2007

Time: 45 minutes

Additional materials: Geometrical instruments
Tracing paper (optional)



* G U E / T 4 0 9 0 7 *

Candidate
Name

Centre
Number

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Candidate
Number

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INSTRUCTIONS TO CANDIDATES

- Write your name, centre number and candidate number in the boxes above.
- Answer **all** the questions.
- Use blue or black ink. Pencil may be used for graphs and diagrams only.
- Read each question carefully and make sure you know what you have to do before starting your answer.
- Show all your working. Marks may be given for working which shows that you know how to solve the problem, even if you get the answer wrong.
- Do **not** write in the bar code.
- Do **not** write outside the box bordering each page.
- WRITE YOUR ANSWER TO EACH QUESTION IN THE SPACE PROVIDED. ANSWERS WRITTEN ELSEWHERE WILL NOT BE MARKED.

INFORMATION FOR CANDIDATES

- The number of marks is given in brackets [] at the end of each question or part question.
- The total number of marks for this Section is 36.



WARNING

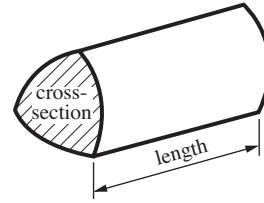
You are not allowed to use a calculator in Section A of this paper.

FOR EXAMINER'S USE	
Section A	
Section B	
Total	

This document consists of **10** printed pages and **2** blank pages.

Formulae Sheet: Higher Tier

Volume of prism = (area of cross-section) \times length

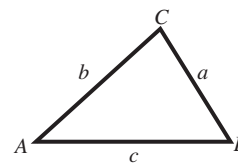


In any triangle ABC

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

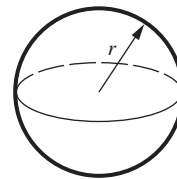
Cosine rule $a^2 = b^2 + c^2 - 2bc \cos A$

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



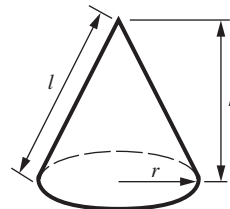
Volume of sphere = $\frac{4}{3} \pi r^3$

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



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

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



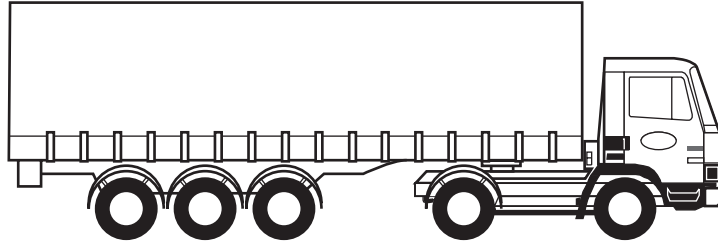
The Quadratic Equation

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

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

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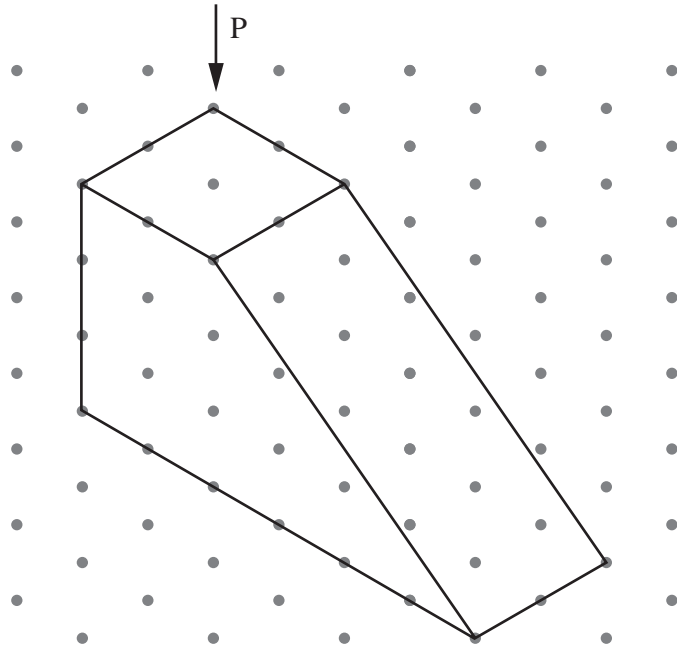
1



Terry is given a model lorry for his birthday.
The scale of the model is 1 : 60.
The model lorry has a length of 15 cm.

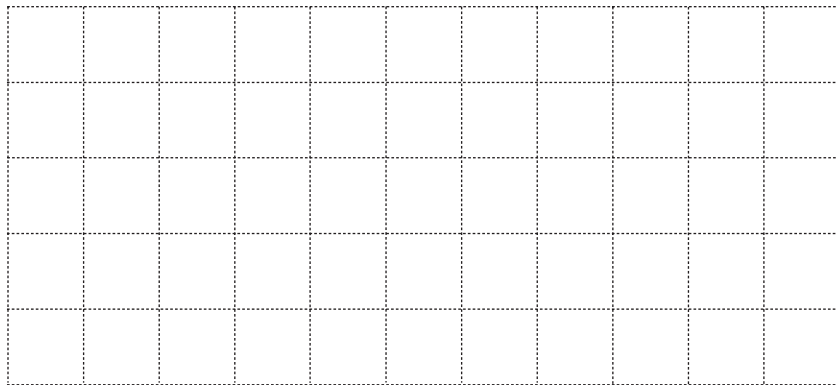
Find the length of the actual lorry.
Give your answer in metres.

.....m [3]



(a) The diagram shows a prism drawn on 1 cm isometric paper.

On the grid, draw an accurate plan of the prism viewed from direction P.



[2]

(b) How many vertices does the prism have?

(b) [1]

(c) The prism has a surface area of 56 cm^2 .
Convert 56 cm^2 into square millimetres.

(c) mm^2 [2]

3 Solve.

$$6x + 11 = 8 + 3x$$

..... [3]

4 (a) Express 108 as the product of its prime factors, using indices.

(a) [3]

(b) Find the reciprocal of 1.5, giving your answer as a fraction in its lowest terms.

(b) [2]

5 (a) Write 73 200 000 in standard form.

(a) [1]

(b) Put these numbers in order of size, **smallest** first.

8.7×10^4 0.0067 230 000 9.1×10^{-2}

(b) [2]

6 Colin wants to estimate how many boys and how many girls in his year group are going away for Christmas.

(a) (i) In his year group there are 110 boys.
He asks 10 of the boys; 3 are going away for Christmas.

Estimate how many boys in the year group are going away for Christmas.

(a)(i) [1]

(ii) In his year group there are 120 girls.
He asks 30 of the girls; 5 are going away for Christmas.

Estimate how many girls in the year group are going away for Christmas.

(ii) [1]

(b) Which of these estimates is likely to be more reliable?
Give a reason for your answer.

.....because
.....
..... [1]

7 A straight line passes through the points A(0, 2) and B(3, 17).

(a) Show that the gradient of AB is 5.

[1]

(b) Write down the equation of the line AB.

(b) [2]

(c) Which of the following equations gives a line parallel to AB?
Give a reason for your answer.

$$y = 2x + 5$$

$$5y = x + 1$$

$$y = 5x + 3$$

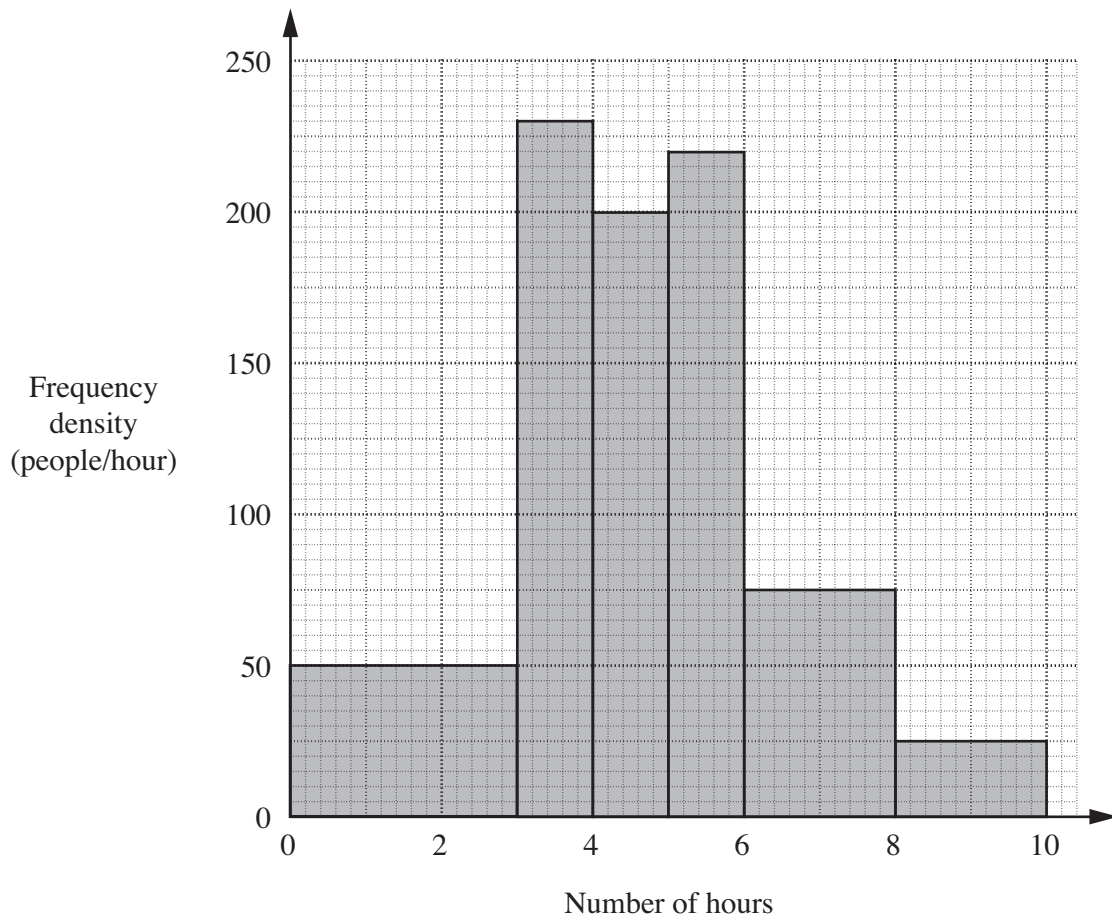
$$2y = 5x$$

Equation

Reason

..... [2]

8 The histogram summarises the times spent at Blackheath Castle by visitors on 1st June.



Calculate an estimate of the percentage of visitors who spent between 2 and 7 hours at the castle.

.....% [3]

9 Evaluate.

$$\sqrt{2} \times \sqrt{18}$$

..... [2]

10 Simplify.

$$\frac{2x^2 - 5x - 3}{x^2 - 2x - 3}$$

..... [4]

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