MATHEMATICS B (MEI)
PAPER 1 SECTION A
HIGHER TIER

1968/2313A

Specimen Paper 2003

Additional materials: Geometrical instruments
                            Tracing paper (optional).

Candidates answer on the question paper.

Calculators are **not** allowed.

TIME 45 minutes.

Candidate Name	Centre Number	Candidate Number

INSTRUCTIONS TO CANDIDATES

- Write your name in the space above.
- Write your Centre number and Candidate number in the boxes above.
- Answer **all** the questions.
- Write your answers, in blue or black ink, in the spaces provided on the question paper.
- 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.

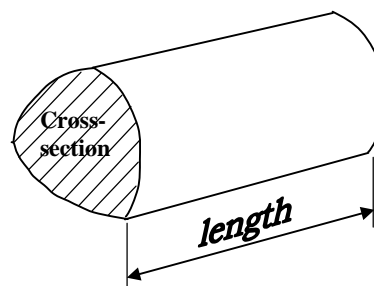**YOU ARE NOT ALLOWEDTO USE A CALCULATOR IN THIS PAPER.**

INFORMATION FOR CANDIDATES

- The number of marks is given in brackets [ ] at the end of each question or part question.

For Examiner's Use Only	
Section A	
Section B	
TOTAL	

FORMULAE SHEET: HIGHER TIER

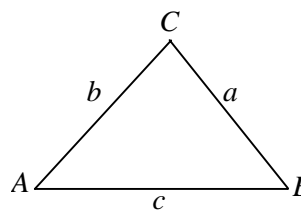**Volume of prism** = (area of cross section) × length

In any triangle ABC

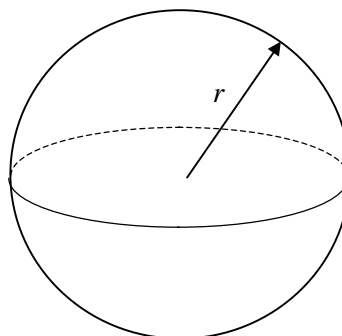**Sine rule** $\dfrac{a}{\sin A}=\dfrac{b}{\sin B}=\dfrac{c}{\sin C}$

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

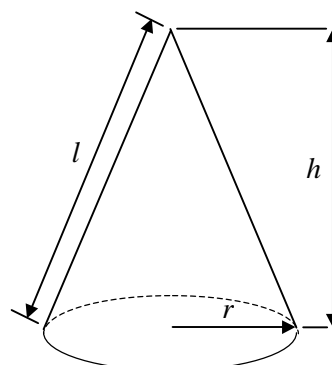**Area of triangle** = $\dfrac{1}{2} ab \sin C$

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

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

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

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

The Quadratic Equation

The solution of $ax^2 + bx + c = 0$ where $a \neq 0$, are given by $x = \dfrac{-b \pm \sqrt{(b^2 - 4ac)}}{2a}$

1 **(a)** Solve the following.

$$5(2x+7)=11+4x$$

Answer   *(a)* $x =$ _____ [3]

(b) Simplify the following.

(i) $a^2 \times a^5$

Answer   *(b) (i)* _____ [1]

(ii) $\left(5c^3d\right)^2$

Answer(ii) _____ [2]

2 Calculate the following.

(a) $64^{\frac{1}{3}}$

Answer   *(a)* _____ [1]

(b) 5^{-2}

Answer   *(b)* _____ [1]

(c) 7^0

Answer   *(c)* _____ [1]

3   Solve $14 + n > 5n - 9$ where n is an integer.

Answer _____ [2]

4   **(a)**   Jim says 'Prime numbers are always odd.'
Explain what a prime number is and prove that Jim is wrong.

Answer (a) _____

_____

_____ [2]

(b)   A number is *perfect* if the sum of all its factors is equal to twice the number.
Show that 28 is *perfect*.

Answer (b) _____

_____

_____ [2]

5   A line l has equation $y = 6 + 2x$.

(a)   Make x the subject of the equation.

Answer *(a)* _____ [2]

(b)   State the gradient of line l.

Answer *(b)* _____ [1]

(c)   Find the equation of the line parallel to l which passes through (3, 10).

Answer *(c)* _____ [2]

6 **(a)** In this question x, y, z are lengths.
Identify the area among the following formulae.
Write down the letter of your choice.

A $\quad \pi xyz^2$ B $\quad \dfrac{3xy}{z}$ C $\quad \dfrac{xyz^2}{x+y+z}$ D $\quad \pi z\sqrt{x^2+y^2}$

Answer *(a)* _____ [1]

(b) Cone X has a volume of 100cm^3.
Cone Y is an enlargement of Cone X by scale factor 2.
Calculate the volume of cone Y.

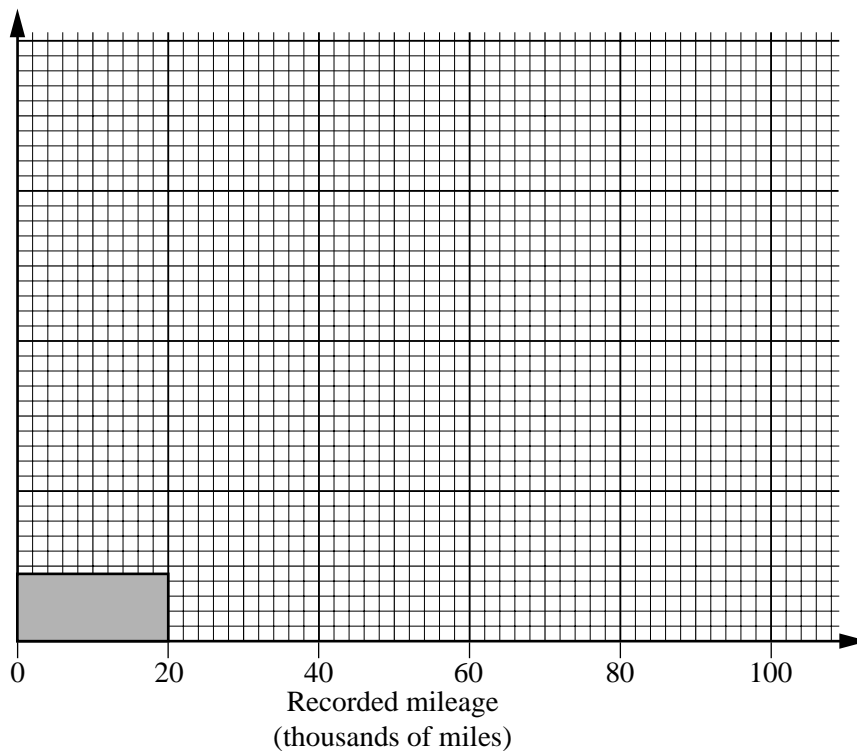*Answer* *(b)* _____ cm^3 [2]

7 Solve by factorising.
$x^2 + 4x - 21 = 0$

Answer $x =$ _____ [3]

8 Jo notes the recorded mileage shown on 120 used cars for sale one weekend.
The table shows the data.

Recorded mileage (x thousand miles)	$0<x\leq20$	$20<x\leq40$	$40<x\leq50$	$50<x\leq60$	$60<x\leq100$
Frequency	9	20	24	31	36

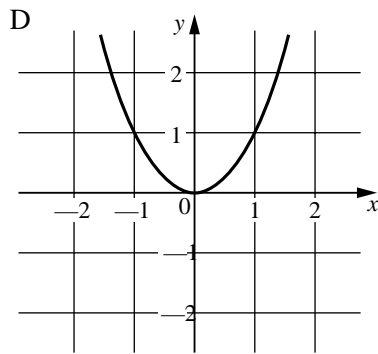**(a)** Complete the histogram to show these data.   [3]

Recorded mileage
(thousands of miles)

(b) Which is the modal class?

Answer *(b)* _____ [1]

9 Look at these four graphs.

A

C

B

D
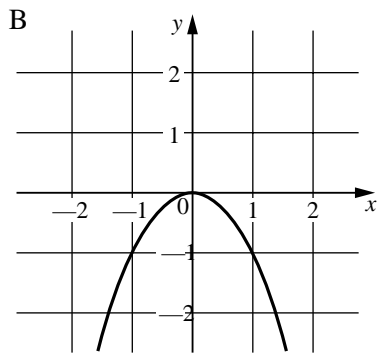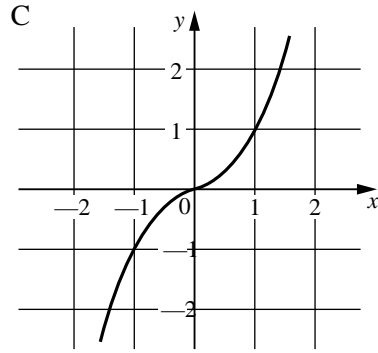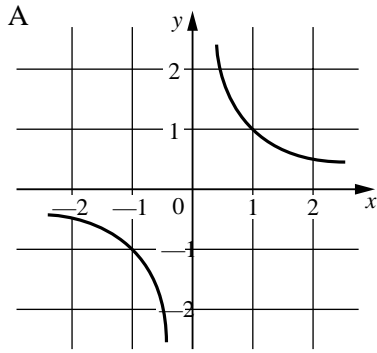
Write down the letter of the graph that represents the following.

(a) $y = x^3$

Answer *(a)* _____ [1]

(b) $y = x^2$

Answer *(b)* _____ [1]

(c) $y = \dfrac{1}{x}$

Answer *(c)* _____ [1]

10 A factory uses two machines to fill cartons with washing powder.
The cartons are labelled "Minimum contents 1.5kg."
The mean mass delivered per carton by each machine is 1.515kg.
The median for machine A is 1.510kg, for machine B 1.520kg.
Checks show that some cartons contain less than 1.5kg.
Which machine is likely to have filled them? Explain your reasoning.

Answer

[3]

Oxford Cambridge and RSA Examinations

General Certificate of Secondary Education

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MARK SCHEME

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SECTION A

1	**(a)**		$10x + 35 = 11 + 4x$	M1	
			$6x = -24$	M1	
			$x = -4$	A1	
	(b)	**(i)**	a^7	B1	
		(ii)	$25c^6d^2$	B2	B1 for $25c^6$ … or $25 … d^2$
2	**(a)**		4	B1	
	(b)		1/25, Accept 0.04	B1	
	(c)		1	B1	
3			$23 > 4n$	B1	
			0, 1, 2, 3, 4, 5	B1	
4	**(a)**		Numbers with (exactly) 2 factors	M1	Accept 'can only be divided by 1 and itself.'
			Counterexample: 2 is prime and is not odd	A1	
	(b)		$1 + 2 + 4 + 7 + 14 + 28 (=56) = 2 \times 28$	B2	B1 for $1 + 2 + 4 + 7 + 14 + 28$
5	**(a)**		$y - 6 = 2x; x = \frac{1}{2}y - 3$ oe	M1 A1	
	(b)		2	B1	
	(c)		$y = 2x + 4$ oe	B1 B1	
6	**(a)**		D	B1	
	(b)		$2 \times 2 \times 2$;	M1	
			800	A1	
7			$(x - 3)(x + 7)$	M2	M1 for $(x\ 3)(x\ 7)$
			3 or -7	A1	
8	**(a)**		Used correct widths, labelled vert. axis, and second block of height 1.0	B1	
			Other blocks of height 2.4, 3.1, 0.9	B2	B1 for 2 correct
	(b)		50 000 to 60 000	B1	Accept 50 to 60
9	**(a)**		C	B1	
	(b)		D	B1	
	(c)		A	B1	
10			For A: More than ½ the cartons contain less than mean	M1	
			So cartons containing less than mean are less spread out	M1	
			So light cartons are likely to come from B	A1	