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Centre Number						Candidate Number				
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**OXFORD CAMBRIDGE AND RSA EXAMINATIONS
GENERAL CERTIFICATE OF SECONDARY EDUCATION**

B293B

MATHEMATICS B (MEI)

**Paper 3 Section B
(Higher Tier)**

MONDAY 18 MAY 2009: Afternoon

DURATION: 45 minutes

SUITABLE FOR VISUALLY IMPAIRED CANDIDATES

Candidates answer on the question paper.

OCR SUPPLIED MATERIALS:

None

OTHER MATERIALS REQUIRED:

Geometrical instruments
Scientific or graphical calculator
Tracing paper (optional)

READ INSTRUCTIONS OVERLEAF

INSTRUCTIONS TO CANDIDATES

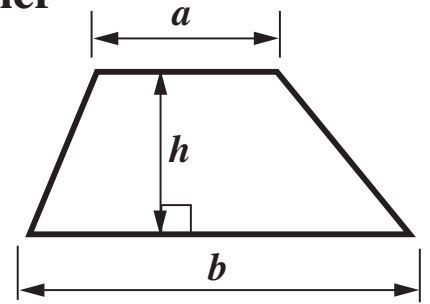
- Write your name clearly in capital letters, your Centre Number and Candidate Number in the boxes on the first page.
- Use black ink. Pencil may be used for graphs and diagrams only.
- Read each question carefully and make sure that you know what you have to do before starting your answer.
- Show all your working. Marks may be given for a correct method even if the answer is incorrect.
- Answer ALL the questions.
- Write your answer to each question in the space provided, however additional paper may be used if necessary.

INFORMATION FOR CANDIDATES

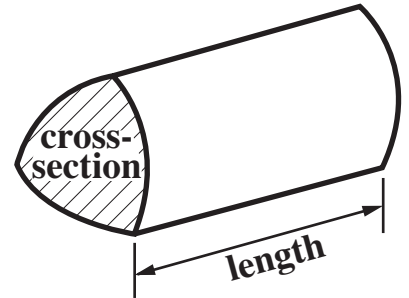
- The number of marks is given in brackets [] at the end of each question or part question.
- Section B starts with question 10.
- You are expected to use a calculator on Section B of this paper.
- Use the π button on your calculator or take π to be 3.142 unless the question says otherwise.
- The total number of marks for this Section is 36.

Formulae Sheet: Higher Tier

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



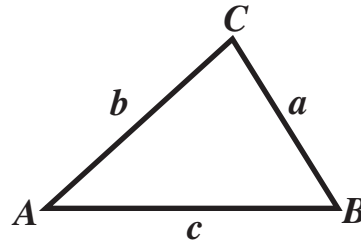
Volume of prism = (area of cross-section) \times length



In any triangle ABC

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

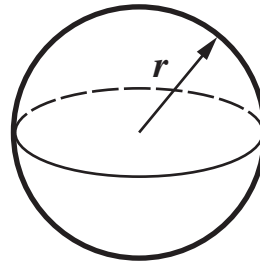
Cosine rule $a^2 = b^2 + c^2 - 2bc \cos A$



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

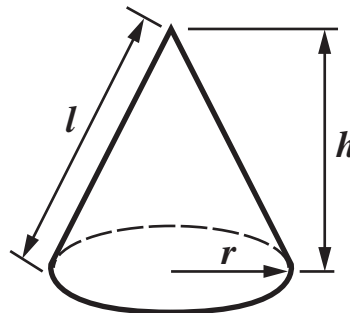
Volume of sphere = $\frac{4}{3}\pi r^3$

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

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

10 There are 190 students in a year group at a school. They all go on an outing by coach, accompanied by 12 teachers.

(a) Each coach can take 39 passengers.

How many coaches are needed to take all the students and teachers on the outing? [3 marks]

(a) _____

(b) Each coach costs £350 to hire for the outing. The teachers do not pay anything.

How much should each student pay to just cover the cost of the coaches? [3 marks]

(b) £ _____

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- 11** A traffic speed camera is set to record the speeds of all vehicles passing it at more than 40 mph. It does not record any other speeds. The table shows the data collected by the camera one afternoon.

Speed (v mph)	Frequency
$40 < v \leq 50$	102
$50 < v \leq 60$	251
$60 < v \leq 70$	82
$70 < v \leq 80$	15
Total	450

- (a) Calculate an estimate of the mean speed of these 450 vehicles. [4 marks]

(a) _____ mph

- (b) Explain why your answer to part (a) is only an estimate. [1 mark]

- (c) If the speed of ALL vehicles passing the camera that afternoon had been recorded, would the mean speed be less than, the same as, or more than your answer to part (a)?
Explain your reasoning. [2 marks]

12 (a) Solve the following.

**(i) $4(x - 3) = 14$
[3 marks]**

(a)(i) _____

**(ii) $6x - 5 < 7$
[2 marks]**

(ii) _____

**(iii) $x^2 + 6x - 7 = 0$
[3 marks]**

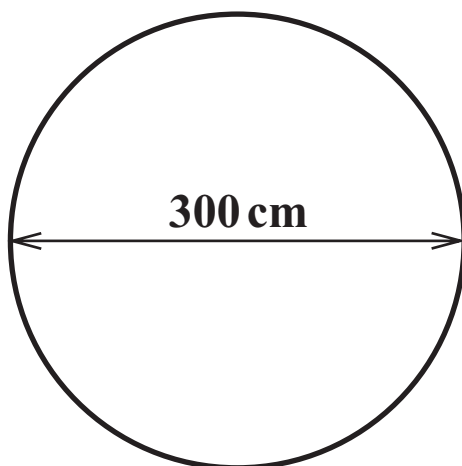
(iii) _____

(b) Factorise $3x^2 - 9xy$
[2 marks]

(b) _____

13 A paddling pool is a cylinder with diameter of length 300 centimetres.

The diagram shows the base of the pool.



(a) Find the area of the base of the paddling pool.
[2 marks]

(a) _____ cm^2

(b) The pool is filled with water to a depth of 60 cm

Find the volume of water in the pool.
Give your answer in litres. [3 marks]

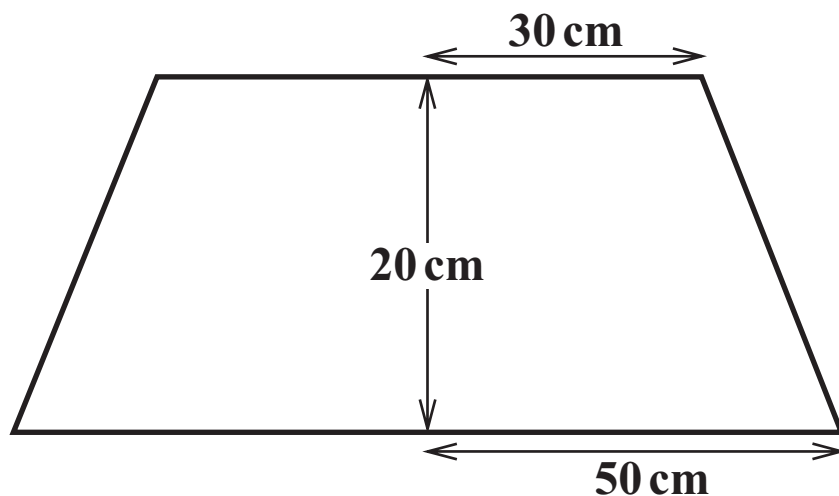
(b) _____ litres

(c) Paul places a heavy box in the water. The box is a cube with side 30 cm

By how much will the water level rise? [4 marks]

(c) _____ cm

- 14 At a dog show each dog has to climb onto a stand.
The stand has the shape of a frustum of a cone.
The diagram below shows the front view of the stand.



The bottom of the stand is a horizontal circle of radius 50 cm

The top of the stand is a horizontal circle of radius 30 cm

The height of the stand is 20 cm

Calculate the volume of the frustum. [4 marks]

_____ cm^3

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