

**OXFORD CAMBRIDGE AND RSA EXAMINATIONS**

**General Certificate of Secondary Education**

**MATHEMATICS B (MEI)**

**PAPER 1 SECTION B**

**HIGHER TIER**

**1968/2313B**

Tuesday

**7 JUNE 2005**

Afternoon

45 minutes

Candidates answer on the question paper.

Additional materials:

Geometrical instruments

Scientific or graphical calculator

Tracing paper (optional)

Candidate Name	Centre Number	Candidate Number

**TIME** 45 minutes

**INSTRUCTIONS TO CANDIDATES**

- Write your name, 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.

**INFORMATION FOR CANDIDATES**

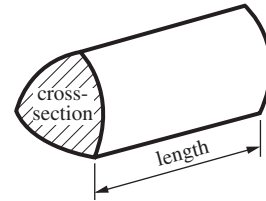
- The number of marks is given in brackets [ ] at the end of each question or part question.
- Unless otherwise instructed in the question, take  $\pi$  to be 3.142 or use the  $\pi$  button on your calculator.
- The total number of marks for this section is 36.
- Section B starts with question 9.

<b>FOR EXAMINER'S USE</b>	
<b>Section B</b>	

**This question paper consists of 8 printed pages.**

## Formulae Sheet: Higher Tier

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

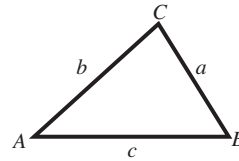


**In any triangle  $ABC$**

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

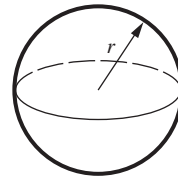
**Cosine rule**  $a^2 = b^2 + c^2 - 2bc \cos A$

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



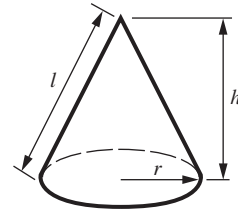
**Volume of sphere** =  $\frac{4}{3} \pi r^3$

**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

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

- 9 Jack invested £4000 in an account that pays 3.7% per year compound interest. He makes no withdrawals.

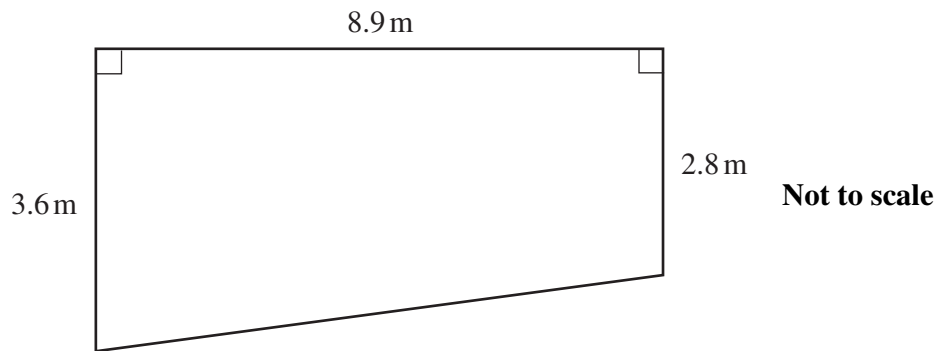
(a) Complete the statement.

After 1 year the total amount in the account is £4000  $\times$  ..... [1]

(b) How much will be in the account after 5 years?

(b) £ ..... [2]

- 10 Dawn is painting a mural covering one side of the wall shown. The ends are vertical, and the top is horizontal.



Dawn can paint 2 square feet an hour.  
1 metre is approximately 3.28 feet.

Calculate how many hours it will take Dawn to paint the mural.

.....h [4]

- 11 The table shows the distribution of the weekly wages earned by 200 students working part-time.

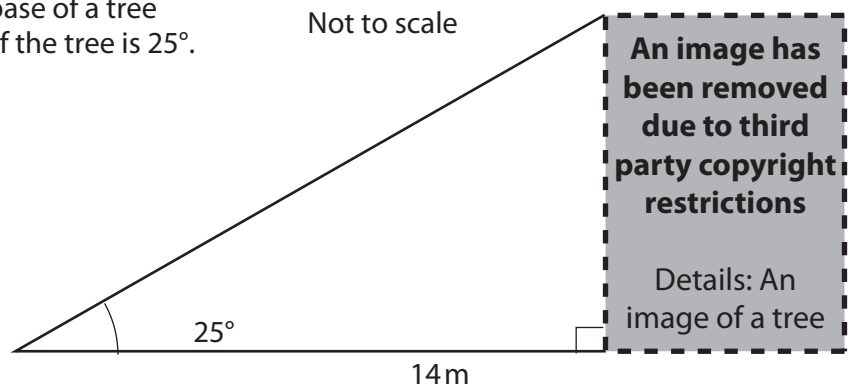
Weekly wages (£w)	Frequency	Mid point
$30 \leq w < 40$	27	35
$40 \leq w < 50$	41	
$50 \leq w < 60$	43	
$60 \leq w < 70$	52	
$70 \leq w < 80$	37	

Calculate an estimate of the mean weekly wages.

£ .....[3]

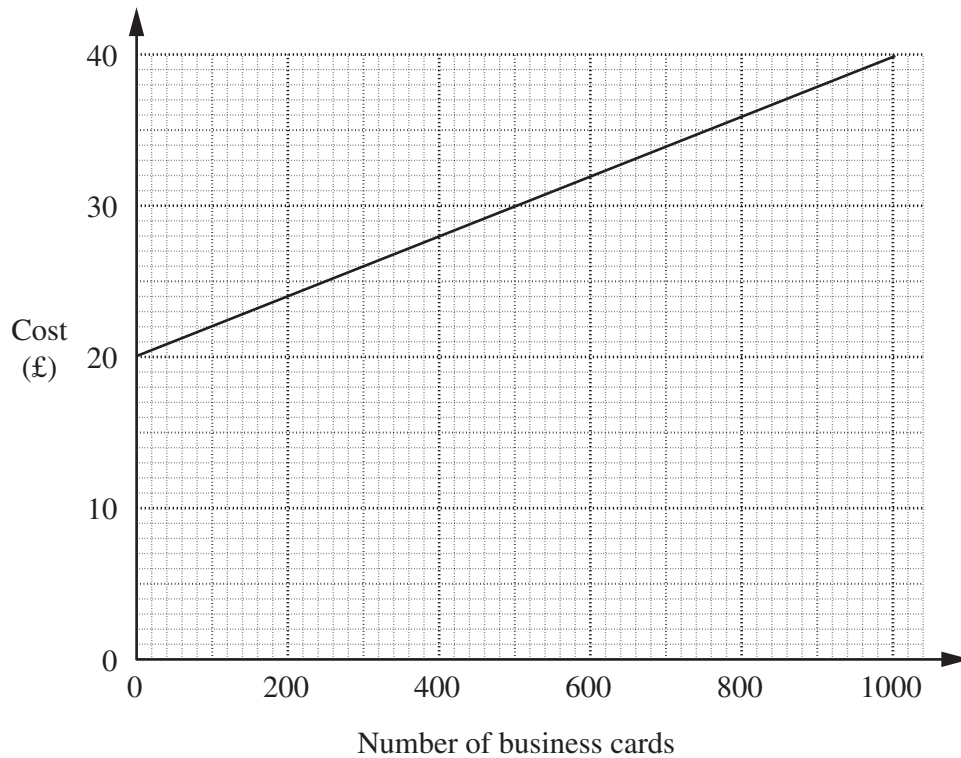
- 12 From a point 14 metres from the base of a tree the angle of elevation of the top of the tree is  $25^\circ$ .

Calculate the height of the tree.



.....m [3]

- 13 The graph shows the cost of printing personal business cards.



- (a) (i) Calculate the gradient of the line.

(a)(i) .....[2]

- (ii) Explain briefly what this gradient represents.

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

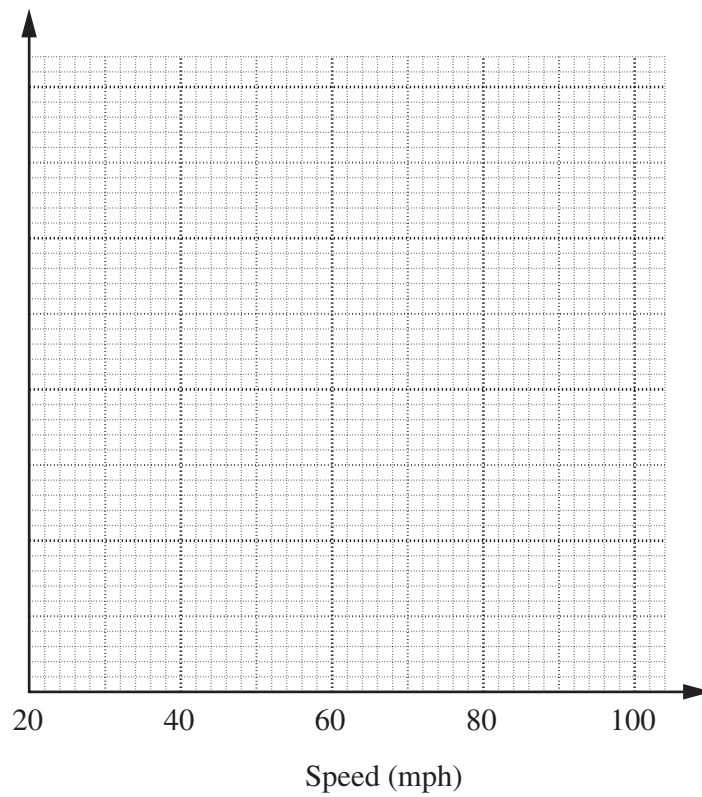
- (b) Find the equation of the line in the form  $y = mx + c$ , where £ $y$  is the cost of printing  $x$  business cards.

(b) .....[2]

- 14** The table shows the distribution of the speeds recorded by a traffic camera one afternoon.

Speed ( $x$ mph)	Frequency
$30 < x \leq 50$	96
$50 < x \leq 60$	76
$60 < x \leq 70$	16
$70 < x \leq 100$	12

- (a) Draw a histogram to illustrate these data.



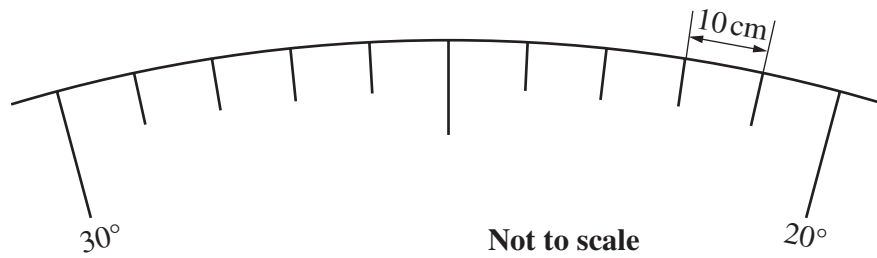
[3]

- (b) David says that 50 to 60 mph is the modal class.

Give a reason in support of his choice.

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

- 15** The diagram represents part of a giant semi-circular protractor being constructed by contestants in a science-based game show.  
Each  $1^\circ$  arc is 10 cm long.



Calculate the radius of the circle.  
Give your answer to the nearest centimetre.

.....cm [3]

- 16 (a)** Factorise.

$$9x^2 - 16y^2$$

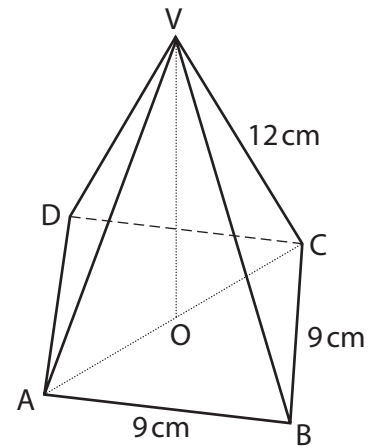
**(a)** .....[2]

- (b)** Make  $x$  the subject of this formula.

$$ax - y = bx + y$$

**(b)** .....[3]

- 17 The base of a pyramid is a horizontal square, ABCD, with side 9 cm.  
 All the sloping edges are 12 cm long, meeting at V.  
 The midpoint of the base is at O, and V is vertically above O.



Calculate the volume of the pyramid.  
 Give the units of your answer.

.....[6]