OCR
RECOGNISING ACHIEVEMENT

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B263B

GENERAL CERTIFICATE OF SECONDARY EDUCATION

MATHEMATICS B (MEI)

Paper 3 Section B (Higher Tier)

MONDAY 19 MAY 2008

Morning

Time: 45 minutes

Candidates answer on the question paper
Additional materials (enclosed): None

Additional materials (required):
Geometrical instruments
Scientific or graphical calculator
Tracing paper (optional)

Candidate Forename		Candidate Surname	

Centre Number		Candidate Number	

INSTRUCTIONS TO CANDIDATES

- Write your name in capital letters, your Centre Number and Candidate Number in the boxes above.
- Use blue or 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.
- Answer **all** the questions.
- Show all your working. Marks may be given for a correct method even if the answer is incorrect.
- Do **not** write in the bar codes.
- Write your answer to each question in the space provided.

INFORMATION FOR CANDIDATES

- The number of marks is given in brackets [ ] at the end of each question or part question.
- You are expected to use a calculator for this section of the 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**.
- Section B starts with question 11.

FOR EXAMINER'S USE

SECTION B	

This document consists of **11** printed pages and **1** blank page.

[Turn over

Formulae Sheet: Higher Tier

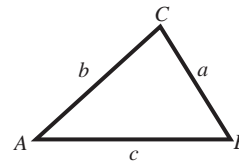**Volume of prism** = (area of cross-section) × length
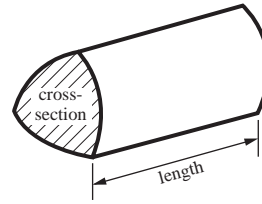
In any triangle *ABC*

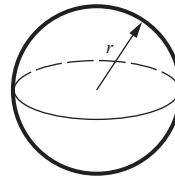**Sine rule** $\dfrac{a}{\sin A} = \dfrac{b}{\sin B} = \dfrac{c}{\sin C}$

Cosine rule $a^2 = b^2 + c^2 - 2bc \cos A$
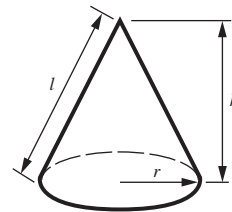
Area of triangle = $\frac{1}{2} ab \sin C$

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

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

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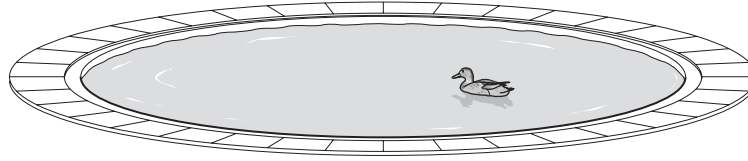
Curved surface area of cone $= \pi r l$

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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11 A circular pond has radius 5.2 metres.

    (a) Calculate the area of the pond.
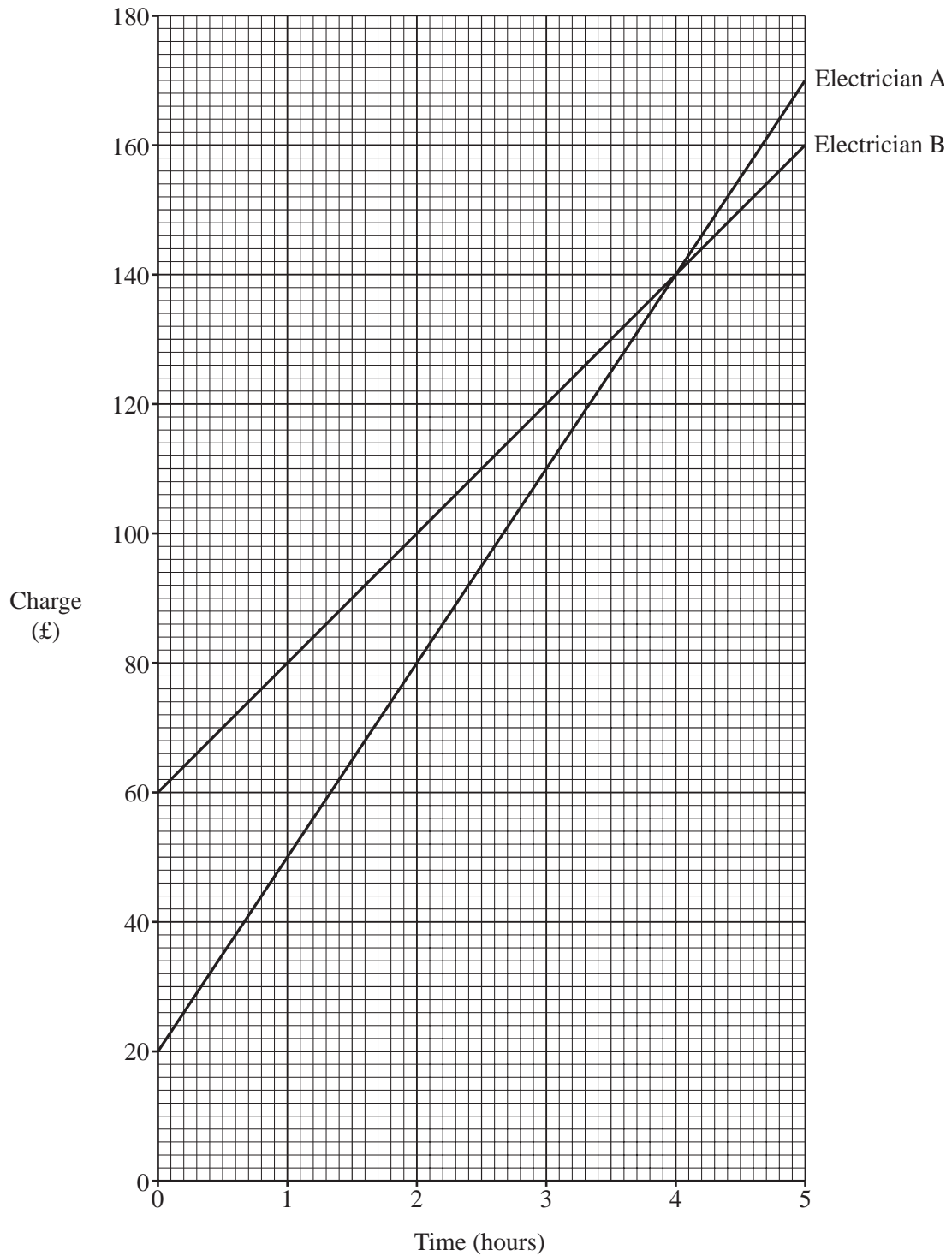   Give your answer to a sensible degree of accuracy.

$$\textbf{(a)} ....\text{m}^2 \text{ [3]}$$

    (b) There is a path around the pond.
          The path is 1 metre wide.

          Calculate the area of the path.

$$\textbf{(b)} ....\text{m}^2 \text{ [3]}$$

[Turn over

12 Katy asked for details of charges from two different electricians.
She drew two lines on a grid to represent their charges for jobs up to 5 hours.

(a) Fill in the information for electrician B to complete the table of charges.

	Call out fee	**Rate per hour**
Electrician A	£20	£30
Electrician B	£	£

[2]

(b) For what length of job do the two electricians charge the same amount?

(b) .... hours [1]
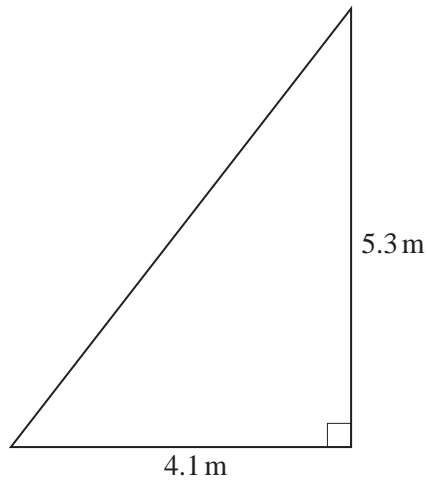
(c) Katy's job will take 2 hours to complete.

Which electrician is cheaper and by how much?

(c) Electrician .... by £ .... [2]

[Turn over

13 The diagram shows a plot of land.

Not to scale

5.3 m

4.1 m

A fence is to be put along the perimeter of the plot.

What is the length of the fence?

.... m [4]

14 The times, t seconds, taken by 50 people to complete a task are summarised in the table.

Time (t seconds)	Number of people
$60 \leq t < 80$	3
$80 \leq t < 100$	7
$100 \leq t < 120$	12
$120 \leq t < 140$	17
$140 \leq t < 160$	6
$160 \leq t < 180$	5

(a) Which is the modal class?

(a).............................. [1]

(b) Calculate an estimate of the mean of these times.

(b)............................s [4]

(c) One of these people is selected at random.

What is the probability that this person completed the task in less than 80 seconds?

(c).............................. [1]

[Turn over

15 (a) Find the value of $8a + 3b$ when $a = 2.5$ and $b = -4$.

(a).............................. [1]

(b) Simplify $p^2 \times p^8$.

(b).............................. [1]

(c) Solve, algebraically, these simultaneous equations.

$$3x + y = 13$$
$$2x - y = 12$$

(c) $x = $ ....

$y = $ .... [2]

(d) Expand and simplify $(2x + 3y)(x - 5y)$.

(d).............................. [3]

16 The diagram represents two sails on a boat.
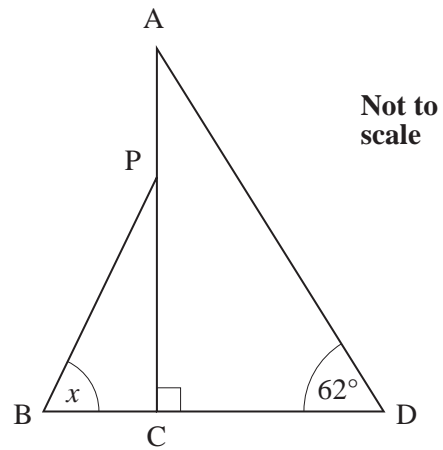
(a) BP = 3.2 m and BC = 1.3 m.

Work out the size of angle x.

(a)..............................° [3]

(b) AD = 4.3 m and angle ADC = 62°.

Show that the length of AC is 3.8 m correct to 1 decimal place. [2]

TURN OVER FOR QUESTION 17

17 A pile of paper contains 1440 sheets, correct to the nearest 10 sheets.
The height of the pile is 180 mm, correct to the nearest 10 mm.

Find the upper bound for the thickness of one sheet of paper.
Give your answer correct to 3 decimal places.

.... mm [3]

11

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