Candidate Forename		Candidate Surname	

Centre Number						Candidate Number				

OXFORD CAMBRIDGE AND RSA EXAMINATIONS
GENERAL CERTIFICATE OF SECONDARY EDUCATION

B282B

MATHEMATICS C (GRADUATED ASSESSMENT)

TERMINAL PAPER – SECTION B (Higher Tier)

FRIDAY 15 JANUARY 2010: Morning
DURATION: 1 hour

SUITABLE FOR VISUALLY IMPAIRED CANDIDATES

Candidates answer on the Question Paper

OCR SUPPLIED MATERIALS:

None

OTHER MATERIALS REQUIRED:

Geometrical instruments
Tracing paper (optional)
Scientific or graphical calculator

READ INSTRUCTIONS OVERLEAF

DC (KN/CGW) MEP10117 23509

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 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 in 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 50.**

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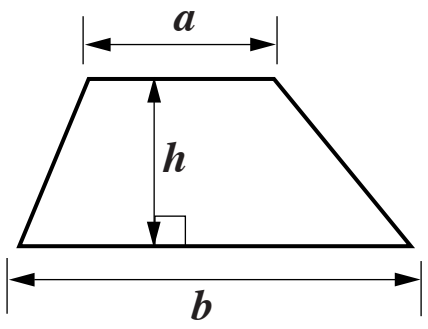
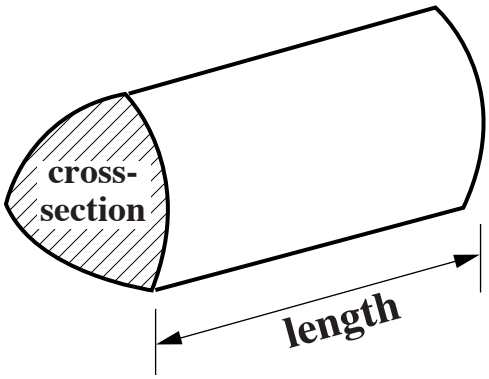
FORMULAE SHEET

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

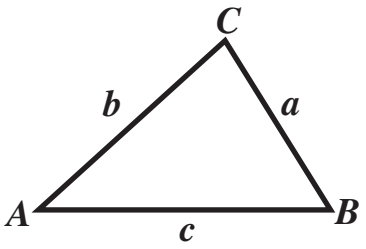


Volume of prism =
(area of cross-section) × length



In any triangle ABC

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

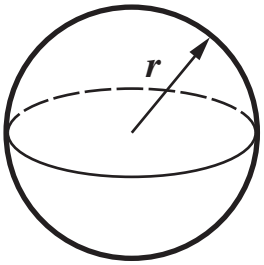


Cosine rule $a^2 = b^2 + c^2 - 2bc \cos A$

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

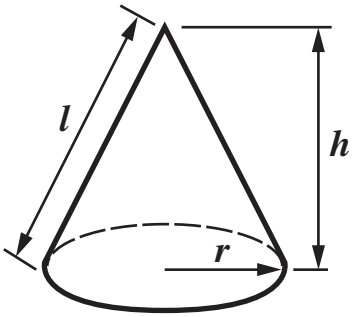
Volume of sphere $= \frac{4}{3}\pi r^3$

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



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

Curved surface area of cone $= \pi rl$

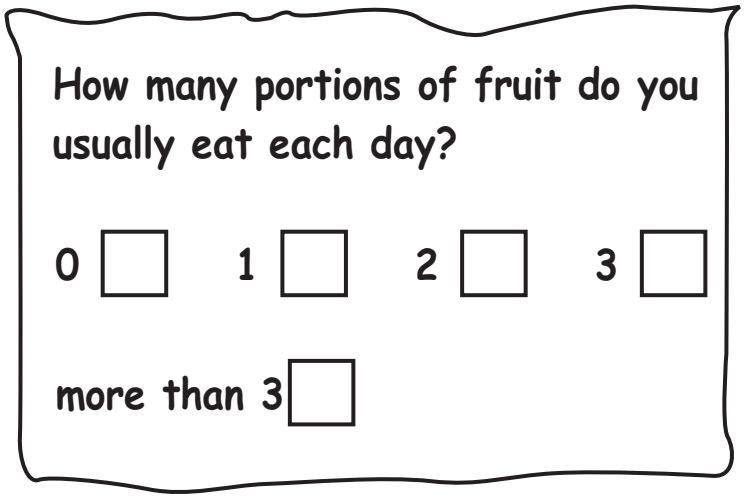


The Quadratic Equation

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

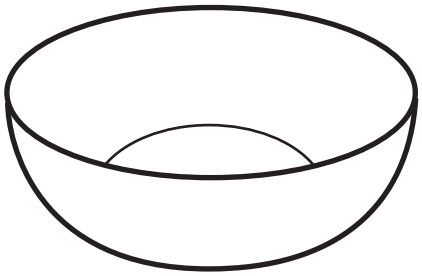
$$x = \frac{-b \pm \sqrt{(b^2 - 4ac)}}{2a}$$

10 (a) Janna is writing a questionnaire about the fruit her friends eat.
In each question she asks them to tick a box from a list of possible responses.



Write a question that Janna could use to find out her friends' favourite fruit.
Include the response boxes.
[2 marks]

(b) This picture shows a fruit bowl.



<u>SKETCH</u> the plan and the elevation of this fruit bowl.
[3 marks]

<u>Plan</u> **<u>Elevation</u>**

11 (a) In the UK in 2006, an average of 410 plastic carrier bags were used per second.

Show that this is equivalent to 35 million bags per day, to the nearest million.
[2 marks]

(b) The capacity of a re-usable cloth bag is 28 000 cm^3.

The capacity of a plastic carrier bag is about 12 000 cm^3.

Write 28 000 : 12 000 as a ratio in its simplest terms.
[2 marks]

(b) _____ : _____

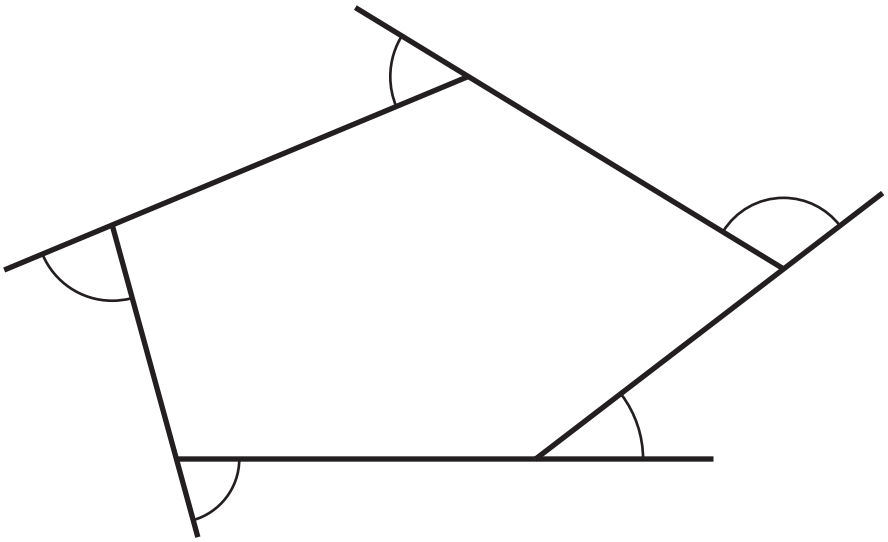
(c) Colin asked the families in his road how many carrier bags they re-used each week.
This table summarises the results.

Number of bags	Number of families (Frequency)
0 to 9	18
10 to 19	16
20 to 29	12
30 to 39	4

Calculate an estimate of the mean number of carrier bags re-used each week by each family.
[4 marks]

(c) _____

12 (a) The diagram below shows a pentagon.



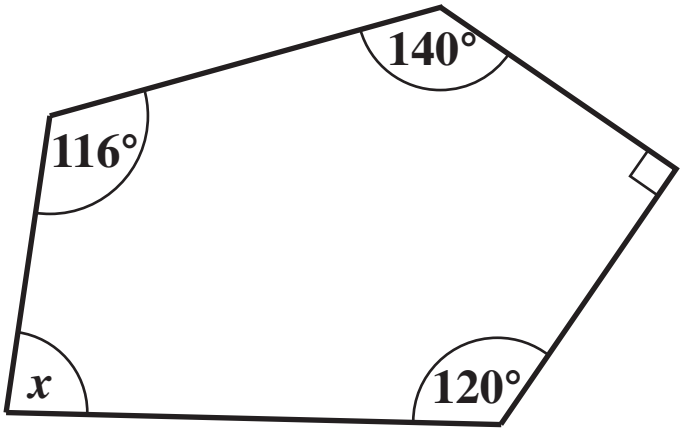
Explain how you can tell that the exterior angles of any pentagon add to 360°.
[1 mark]

_____

_____

_____

(b) The diagram below shows a second pentagon.

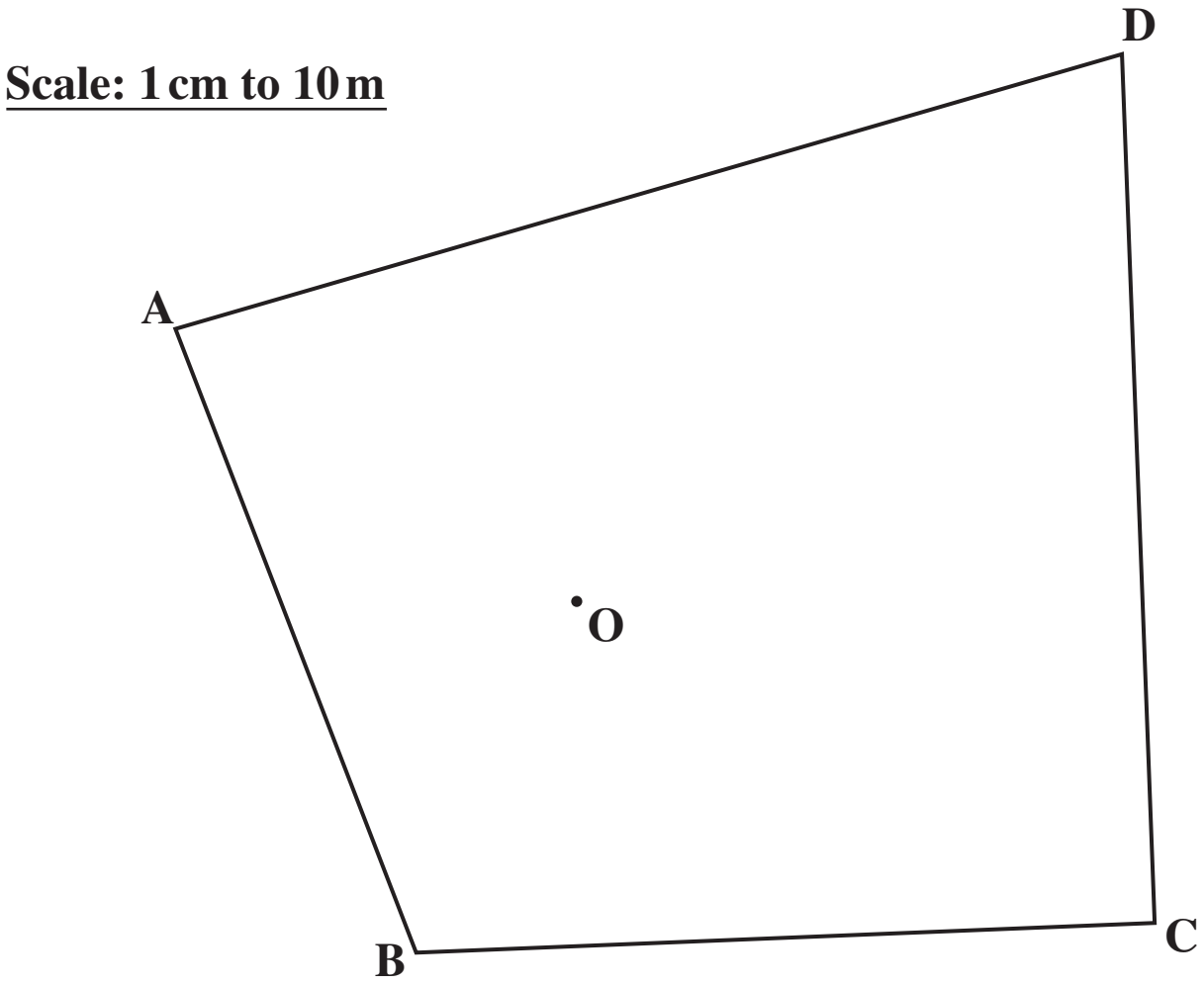


Not to scale

In this pentagon, find angle *x*.
[3 marks]

(b) _____ °

13 The scale drawing shows a park ABCD.
There is an old oak tree at O.



The council wants to put a bandstand in the park.

It should be

- **at least 20 m from the old oak tree at O,**
- **at least 50 m from the boundary CD,**
- **nearer to gate A than to gate B.**

Construct and shade the region where the bandstand can go.
Leave in all your construction lines.
[4 marks]

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14 (a) Solve.

$$5(x - 3) = 4$$

[3 marks]

(a) _____

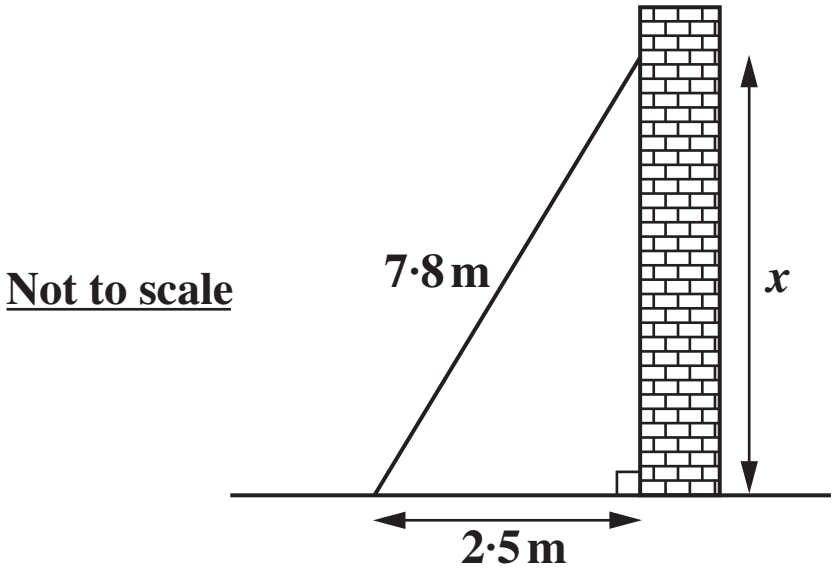
(b) Factorise and solve.

$$x^2 + 2x - 8 = 0$$

[3 marks]

(b) _____

15 (a) A ladder 7·8 m long is leaning against a wall, as shown. The foot of the ladder is 2·5 m from the wall.

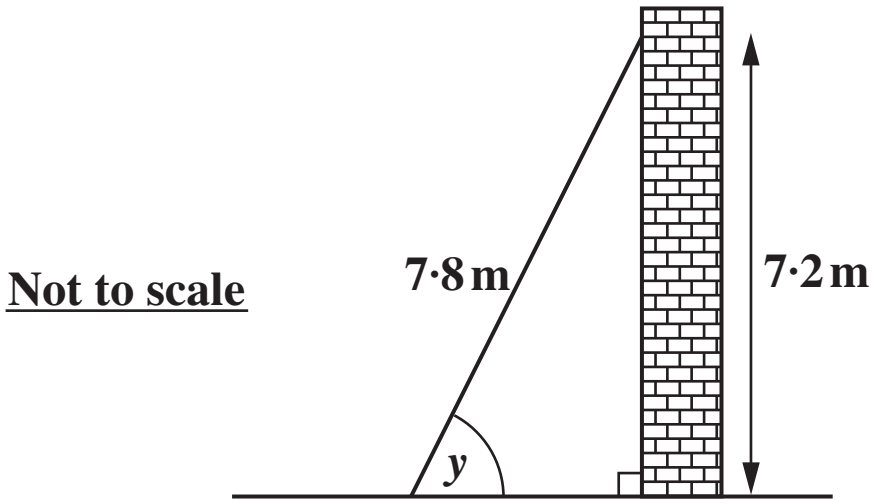


Calculate x, the distance the ladder reaches up the wall. Give your answer to a sensible degree of accuracy.
[4 marks]

(a) _____ m

(b) The ladder is moved so that it now reaches 7·2 m up the wall.

For greatest safety, the angle, *y*, between the ladder and the ground should be about 75°.



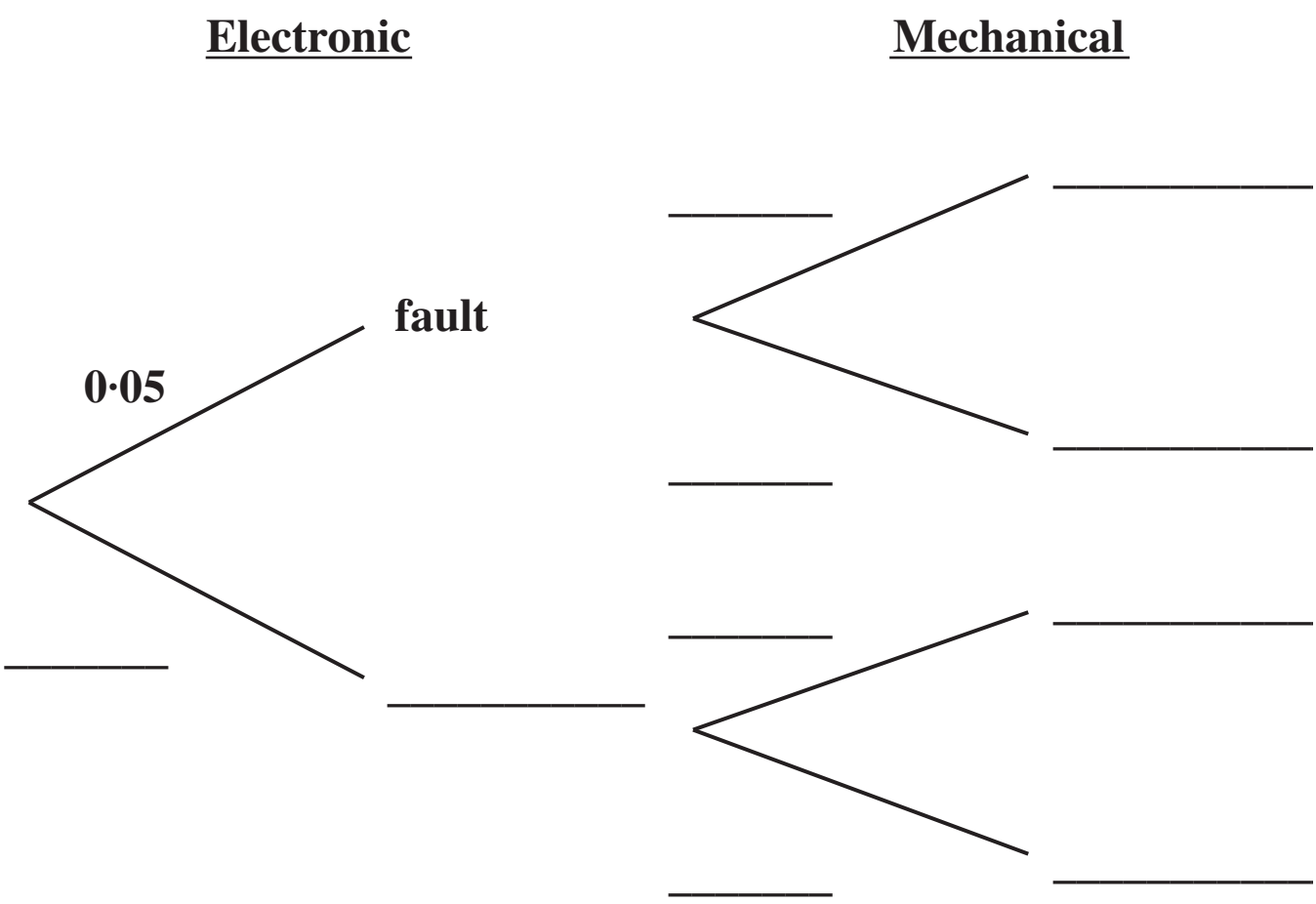
State whether or not the ladder is near this position of greatest safety.
Use calculations to support your answer.
[3 marks]

_____

_____ **[3]**

16 Cars are made on a factory production line.
The probability that one of these cars has an electronic fault is 0·05.
The probability that one of these cars has a mechanical fault is 0·02.
These events are independent.

(a) Complete the tree diagram.
[2 marks]



(b) Calculate the probability that a car from this production line has neither of these faults.
[2 marks]

(b) _____

17 Solve algebraically these simultaneous equations.

$$x + 2y = 2$$
$$2x - y = 5$$

[3 marks]

$x =$ _____

$y =$ _____

18 y **is inversely proportional to** x^2**.**
$y = 9$ **when** $x = 2$**.**

(a) Find an equation connecting y **and** x**.**
[3 marks]

(a) _____

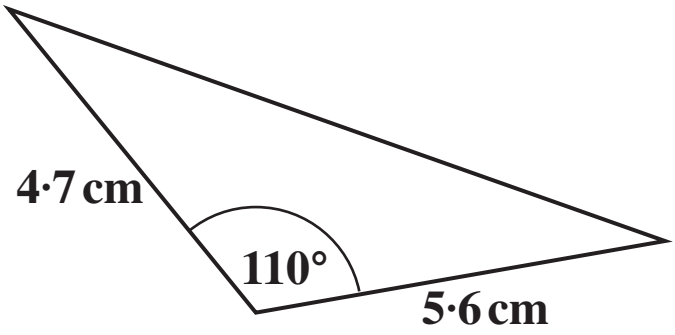
(b) Find the positive value of x **when** $y = 4$**.**
[1 mark]

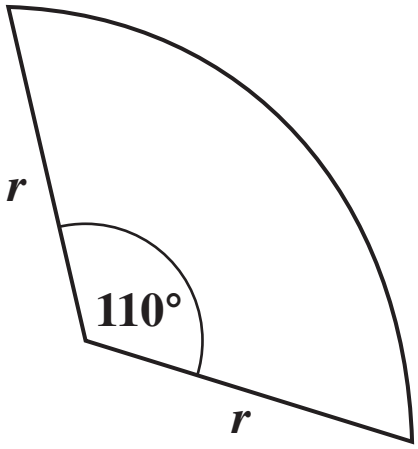
(b) _____

TURN OVER FOR QUESTION 19

19 This triangle and this sector of a circle have the same area.

Not to scale





Calculate the radius, *r*, of the sector.
[5 marks]

_____ **cm**

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