OCR
RECOGNISING ACHIEVEMENT

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GENERAL CERTIFICATE OF SECONDARY EDUCATION
MATHEMATICS C (GRADUATED ASSESSMENT)
TERMINAL PAPER – SECTION B (Higher Tier)

B282B

Candidate Forename		Candidate Surname	

| Centre Number						Candidate Number					

INSTRUCTIONS TO CANDIDATES
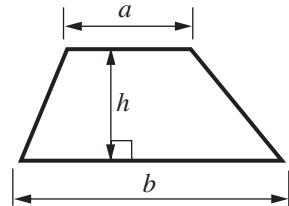
* Write your name clearly in capital letters, your Centre Number and Candidate Number in the boxes above.
* Use black ink. Pencil may be used for graphs and diagrams only.
* Read each question carefully and make sure that you know what you have to do before starting your answer.
* Show all your working. Marks may be given for a correct method even if the answer is incorrect.
* Answer **all** the questions.
* Do **not** write in the bar codes.
* Write your answer to each question in the space provided, however additional paper may be used if necessary.

INFORMATION FOR CANDIDATES
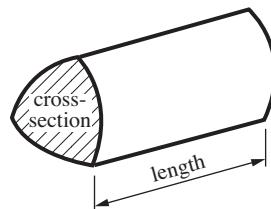
* The number of marks is given in brackets **[ ]** at the end of each question or part question.
* Section B starts with question 10.
* You are expected to use a calculator in Section B of this paper.
* Use the π button on your calculator or take π to be 3·142 unless the question says otherwise.
* The total number of marks for this Section is **50**.
* This document consists of **12** pages. Any blank pages are indicated.

Turn over

Formulae Sheet

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

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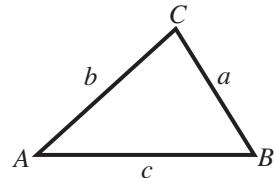
In any triangle *ABC*

Sine rule $\quad \dfrac{a}{\sin A} = \dfrac{b}{\sin B} = \dfrac{c}{\sin C}$
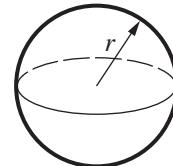
Cosine rule $\quad a^2 = b^2 + c^2 - 2bc \cos A$

**Area of triangle** = $\frac{1}{2}ab \sin C$
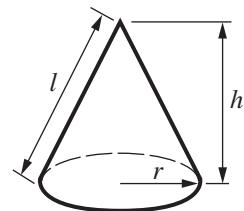
Volume of sphere = $\frac{4}{3}\pi r^3$

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

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

PLEASE DO NOT WRITE ON THIS PAGE

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.
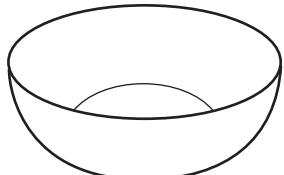
How many portions of fruit do you usually eat each day?

0 ☐   1 ☐   2 ☐   3 ☐

more than 3 ☐

[2]

(b) This picture shows a fruit bowl.

Sketch the plan and the elevation of this fruit bowl.

<u>Plan</u>   <u>Elevation</u>
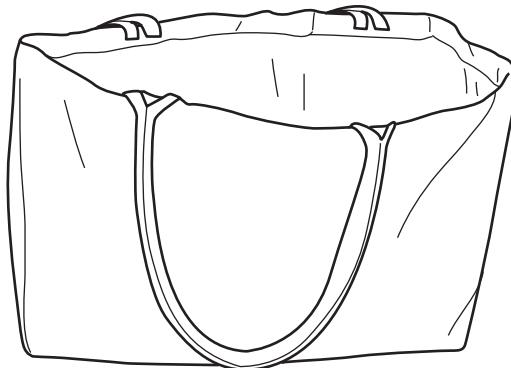
[3]

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]**

(b) The capacity of this re-usable cloth bag is $28\,000\,\text{cm}^3$.

The capacity of a plastic carrier bag is about $12\,000\,\text{cm}^3$.

Write $28\,000 : 12\,000$ as a ratio in its simplest terms.

(b) .... : .... **[2]**
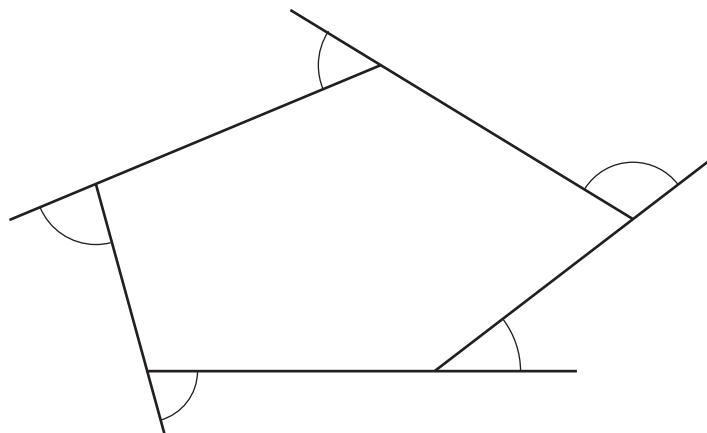
**(c)** Colin asked the families in his road how many carrier bags they re-used each week.
This table summarises the results.

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.

(c) .... **[4]**

Turn over

12 (a)
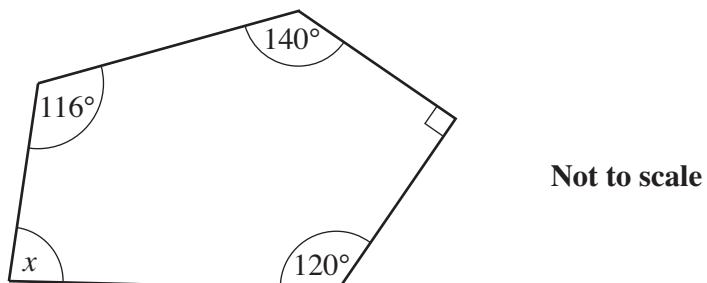
Explain how you can tell that the exterior angles of any pentagon add to 360°.

....

....

....**[1]**

(b)

Not to scale
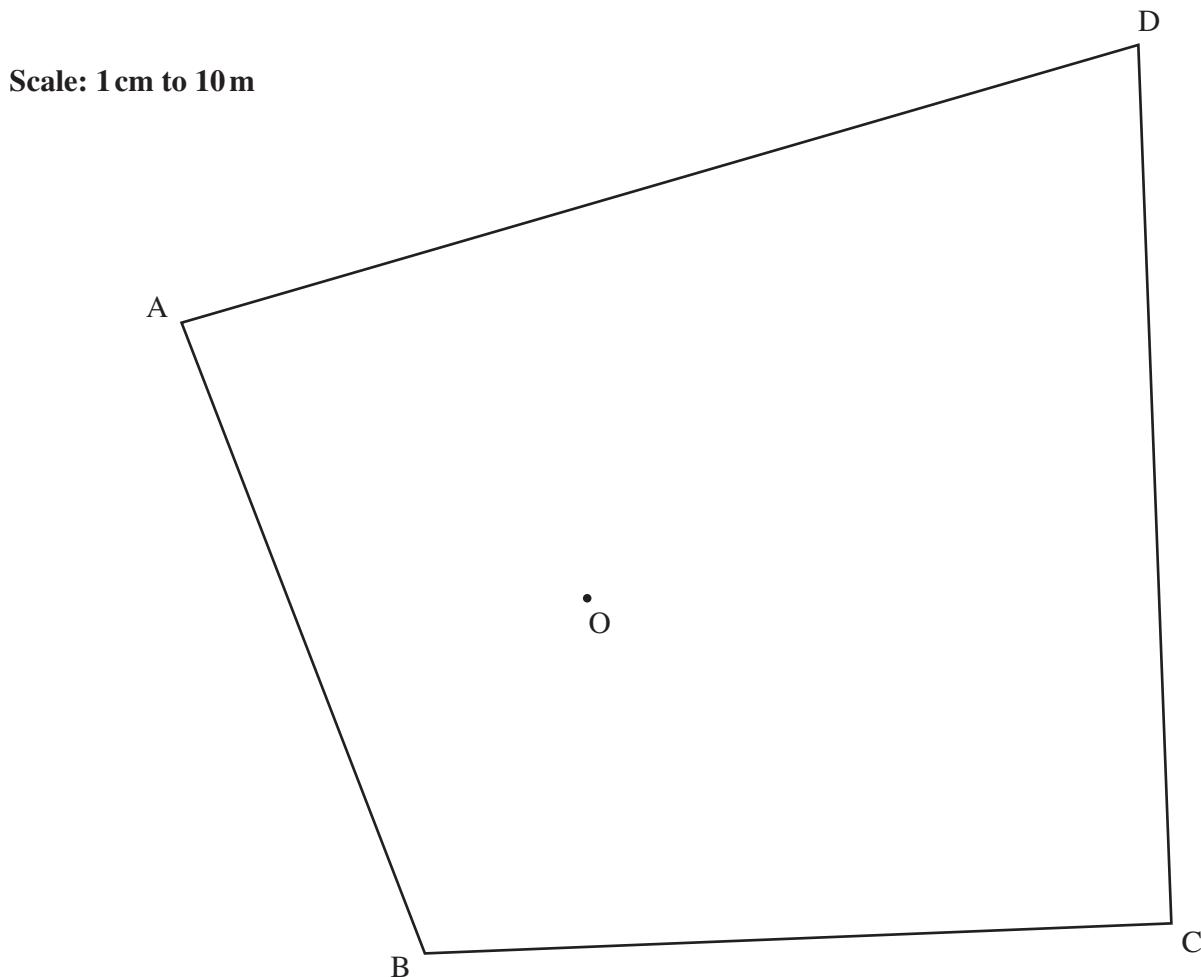
In this pentagon, find angle x.

(b) ....° **[3]**

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

Scale: 1 cm to 10 m

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]**

14 **(a)** Solve.

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

(a) .... **[3]**

(b) Factorise and solve.
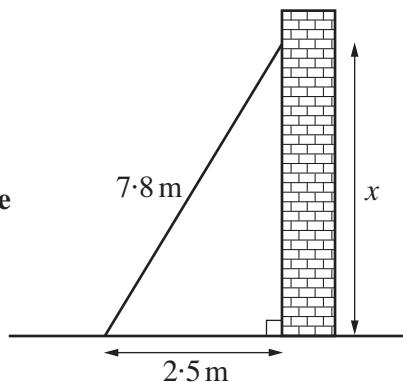
$$x^2 + 2x - 8 = 0$$

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

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.

Not to scale

7·8 m

x

2·5 m
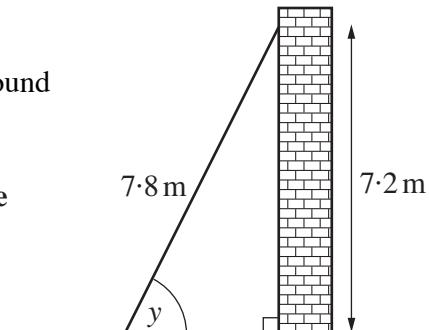
(a) .... m **[4]**

(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.

Not to scale

7·8 m

7·2 m

y

....

.... **[3]**
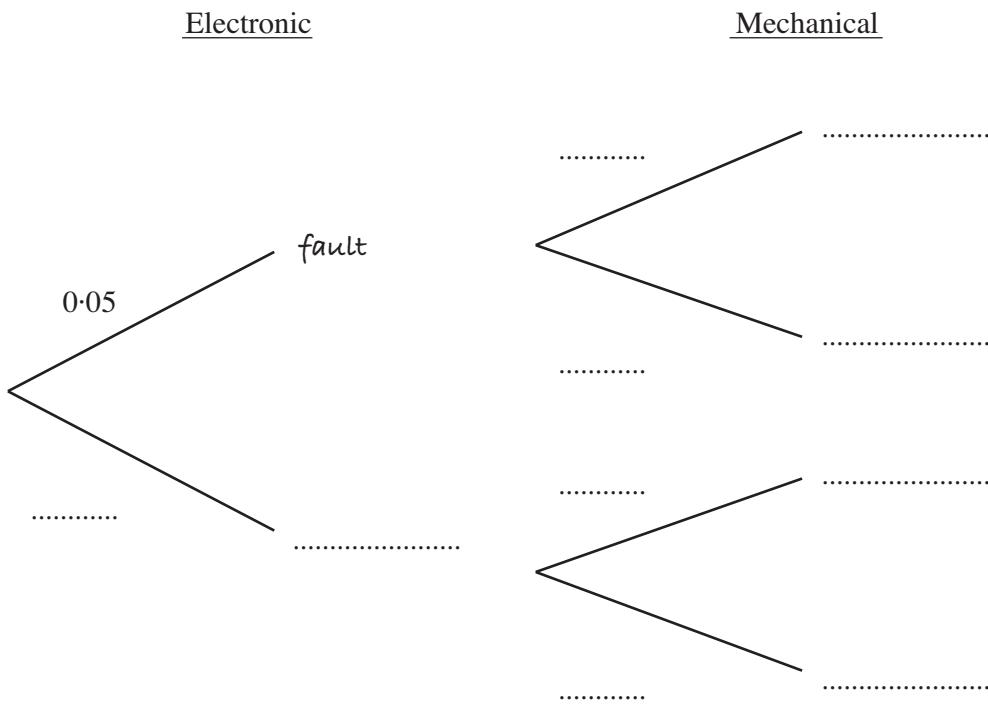
16 Cars are made on a factory production line.
The probability that one of these cars has an electronic fault is 0·05.
The probability that one of these cars has a mechanical fault is 0·02.
These events are independent.

(a) Complete the tree diagram.

Electronic   Mechanical

fault

0·05

....

....

....

....

....

....

[2]

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

(b) .... [2]

17 Solve algebraically these simultaneous equations.

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

$x =$ ....

$y =$ .... **[3]**

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

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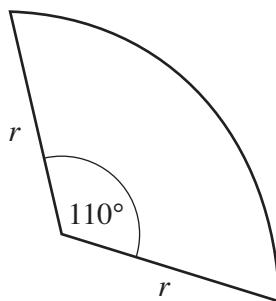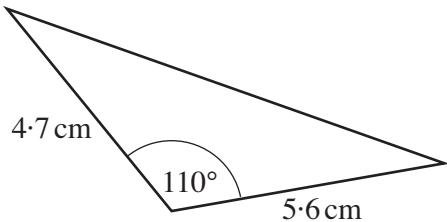
(a) .... **[3]**

   (b) Find the positive value of x when $y = 4$.

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

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

Not to scale

Calculate the radius, r, of the sector.

....................................cm **[5]**