

|                               |  |  |  |  |  |                              |                             |  |  |  |
|-------------------------------|--|--|--|--|--|------------------------------|-----------------------------|--|--|--|
| <b>Candidate<br/>Forename</b> |  |  |  |  |  | <b>Candidate<br/>Surname</b> |                             |  |  |  |
| <b>Centre<br/>Number</b>      |  |  |  |  |  |                              | <b>Candidate<br/>Number</b> |  |  |  |

**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**

## **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.

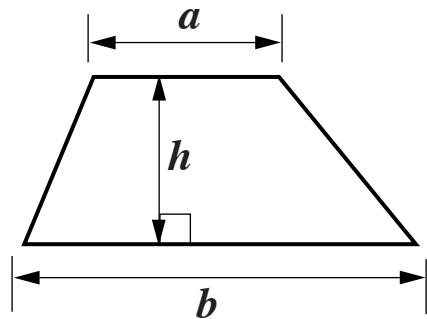
## **INFORMATION FOR CANDIDATES**

- 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  $\pi$  button on your calculator or take  $\pi$  to be 3.142 unless the question says otherwise.
- The total number of marks for this Section is **50**.

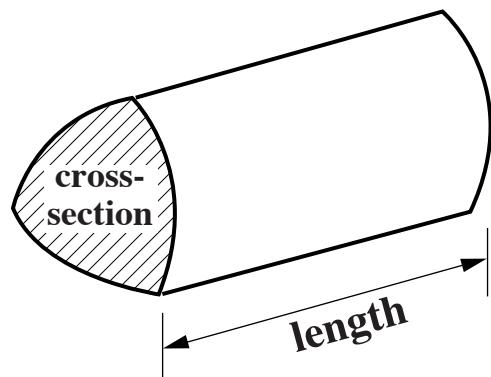
## **BLANK PAGE**

## FORMULAE SHEET

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



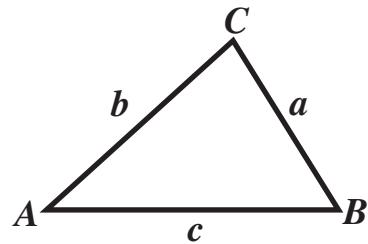
$$\begin{aligned}\text{Volume of prism} = \\ (\text{area of cross-section}) \times \text{length}\end{aligned}$$



In any triangle  $ABC$

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

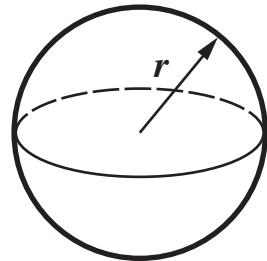
Cosine rule  $a^2 = b^2 + c^2 - 2bc \cos A$



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

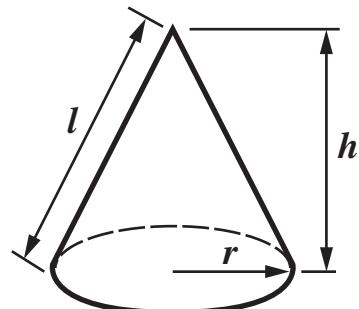
Volume of sphere =  $\frac{4}{3}\pi r^3$

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 (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.**

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

0  1  2  3

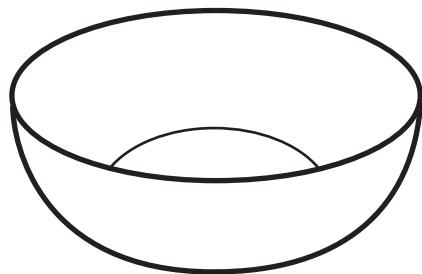
more than 3

**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.**



**SKETCH the plan and the elevation of this fruit bowl.  
[3 marks]**

**Plan**

**Elevation**

- 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  $28\,000\text{ cm}^3$ .**

**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.**

**[2 marks]**

**(b) \_\_\_\_\_ : \_\_\_\_\_**

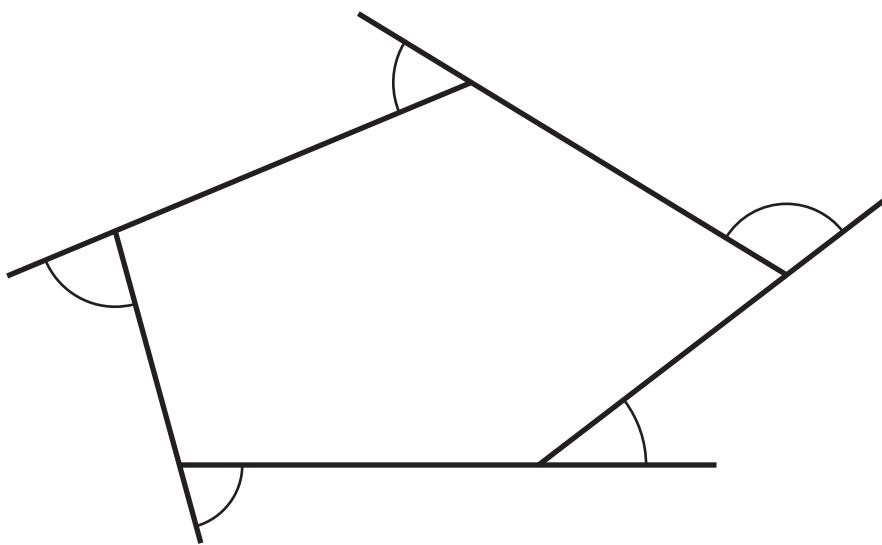
- (c) Colin asked the families in his road how many carrier bags they re-used each week.  
This table summarises the results.

| 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  $360^\circ$ .**

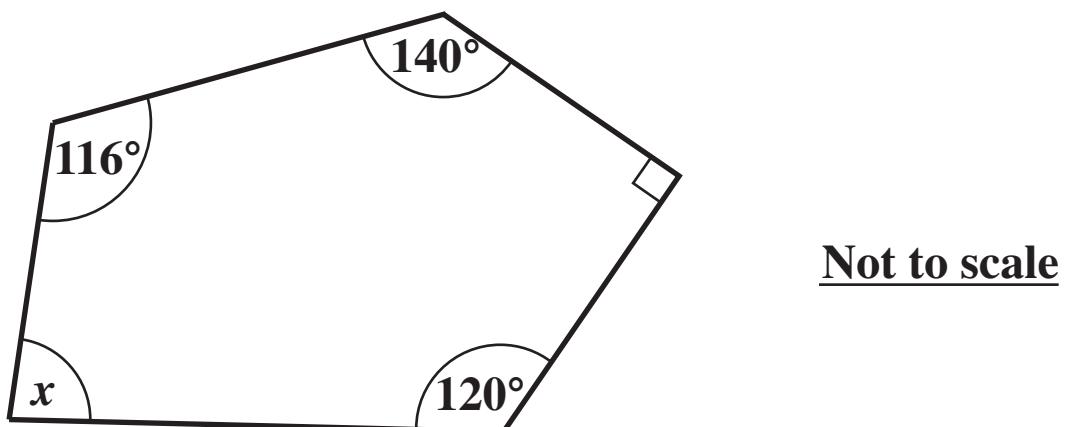
**[1 mark]**

---

---

---

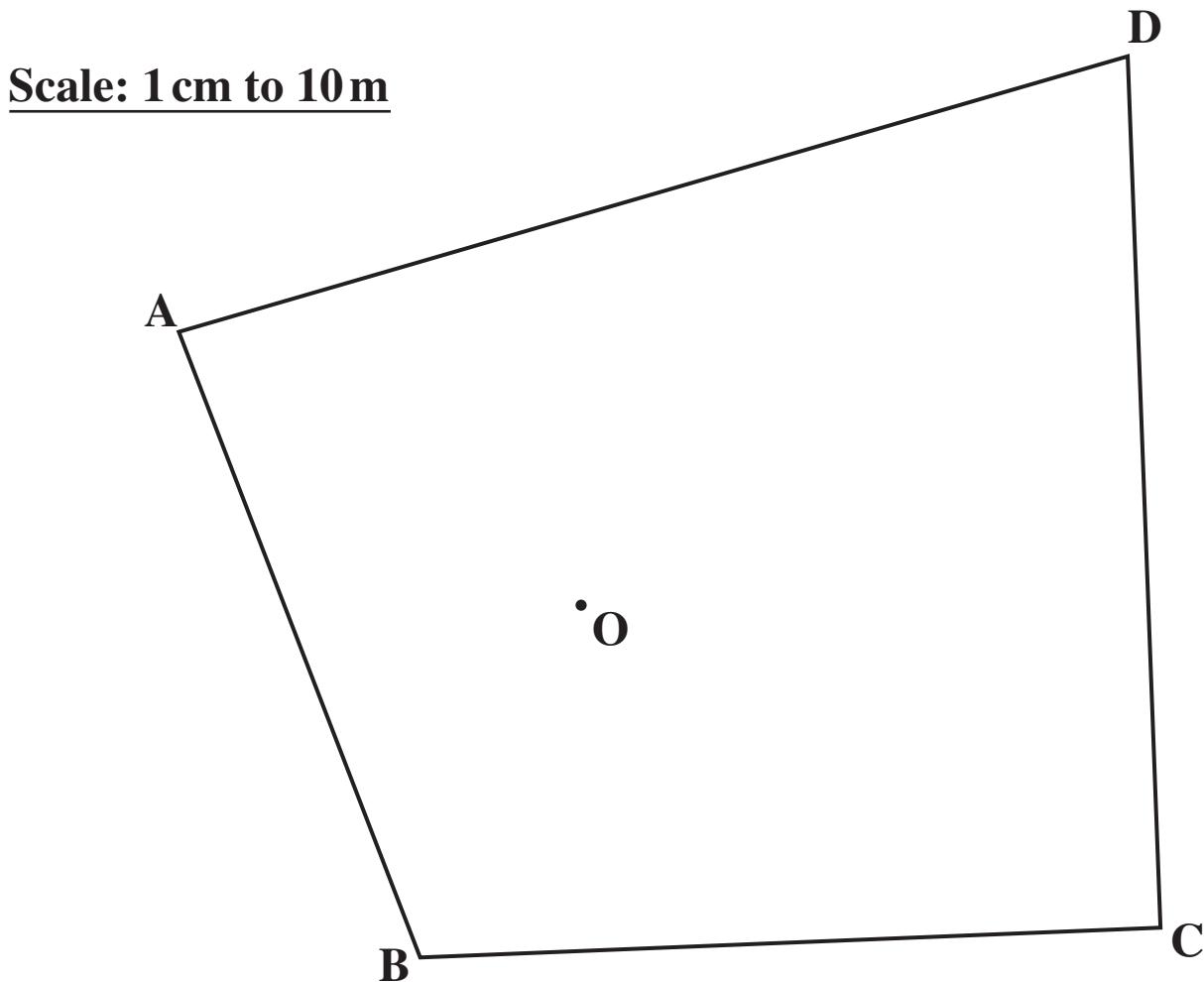
(b) The diagram below shows a second pentagon.



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]**

## **BLANK PAGE**

**14 (a) Solve.**

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

[3 marks]

(a) \_\_\_\_\_

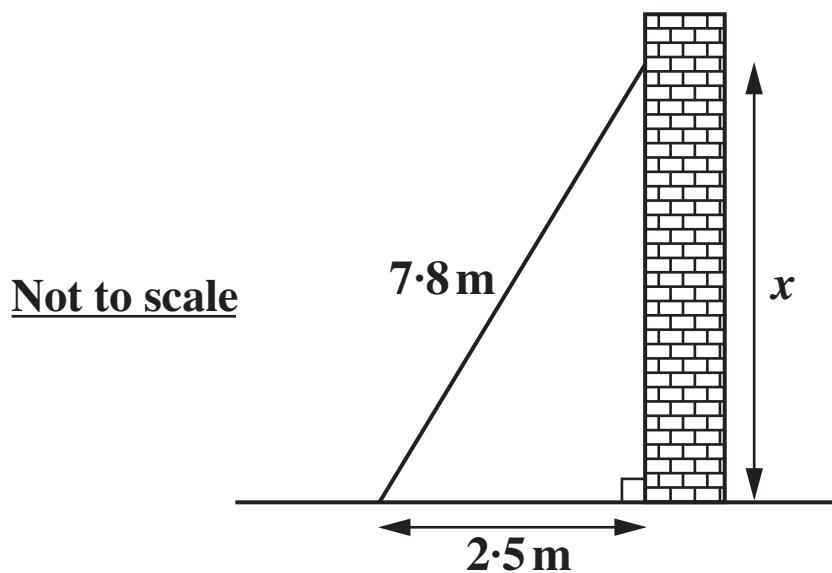
**(b) Factorise and solve.**

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

[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.

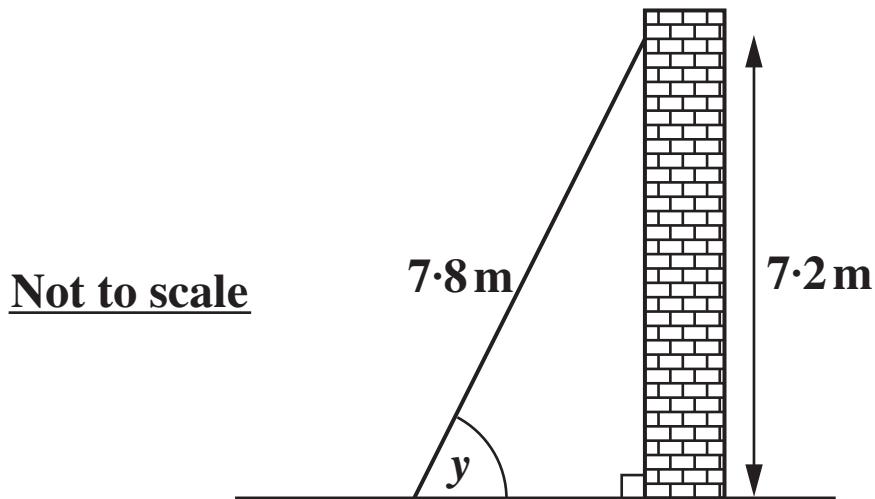


Calculate  $x$ , the distance the ladder reaches up the wall.  
Give your answer to a sensible degree of accuracy.  
[4 marks]

(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  $75^\circ$ .



State whether or not the ladder is near this position of greatest safety.

Use calculations to support your answer.

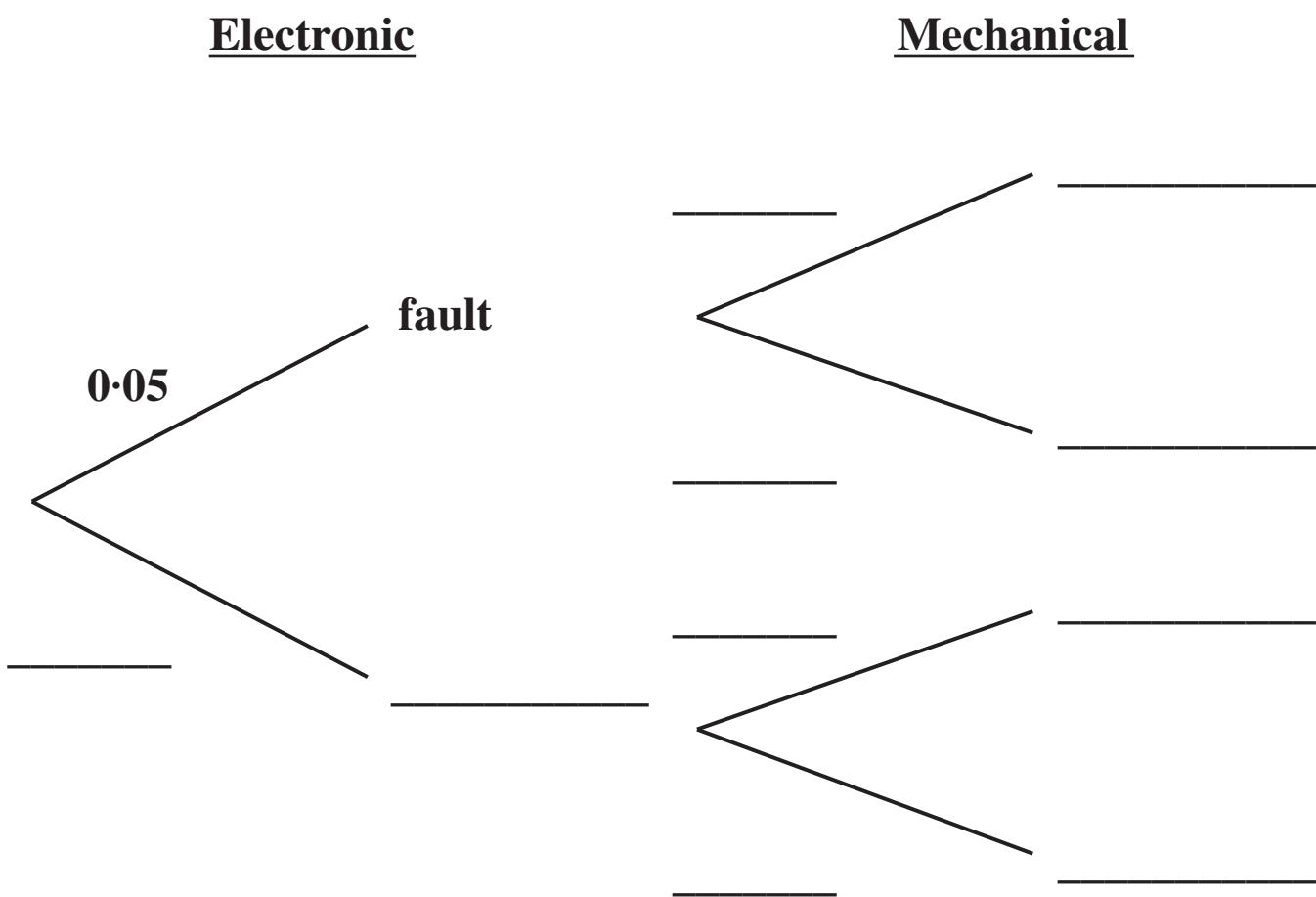
[3 marks]

---

[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.

$$\begin{aligned}x + 2y &= 2 \\2x - y &= 5\end{aligned}$$

[3 marks]

$$x = \underline{\hspace{2cm}}$$

$$y = \underline{\hspace{2cm}}$$

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

$y = 9$  when  $x = 2$ .

**(a)** Find an equation connecting  $y$  and  $x$ .

[3 marks]

(a) \_\_\_\_\_

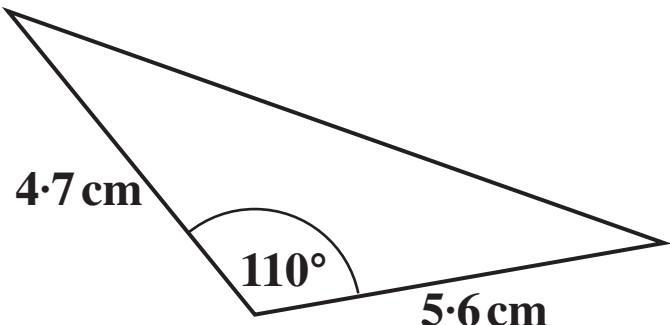
**(b)** Find the positive value of  $x$  when  $y = 4$ .

[1 mark]

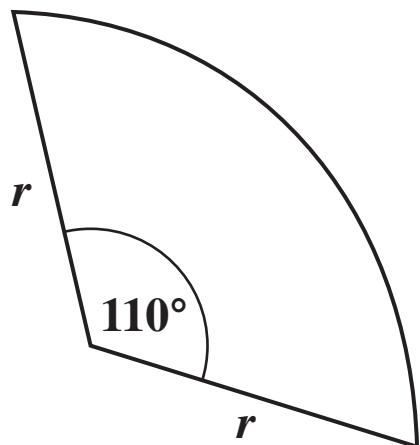
(b) \_\_\_\_\_

**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

## **BLANK PAGE**



## **Copyright Information**

**OCR is committed to seeking permission to reproduce all third-party content that it uses in its assessment materials. OCR has attempted to identify and contact all copyright holders whose work is used in this paper. To avoid the issue of disclosure of answer-related information to candidates, all copyright acknowledgements are reproduced in the OCR Copyright Acknowledgements Booklet. This is produced for each series of examinations, is given to all schools that receive assessment material and is freely available to download from our public website ([www.ocr.org.uk](http://www.ocr.org.uk)) after the live examination series.**

**If OCR has unwittingly failed to correctly acknowledge or clear any third-party content in this assessment material, OCR will be happy to correct its mistake at the earliest possible opportunity.**

**For queries or further information please contact the Copyright Team, First Floor, 9 Hills Road, Cambridge CB2 1GE.**

**OCR is part of the Cambridge Assessment Group; Cambridge Assessment is the brand name of University of Cambridge Local Examinations Syndicate (UCLES), which is itself a department of the University of Cambridge.**