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**OXFORD CAMBRIDGE AND RSA EXAMINATIONS  
GENERAL CERTIFICATE OF SECONDARY EDUCATION**

**B282B**

**MATHEMATICS C  
(GRADUATED ASSESSMENT)**

**Terminal Paper (Section B) (Higher Tier)**

**MONDAY 6 JUNE 2011: Afternoon**

**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)**

**Pie chart scale (optional)**

**Scientific or graphical calculator**

**READ INSTRUCTIONS OVERLEAF**

## **INSTRUCTIONS TO CANDIDATES**

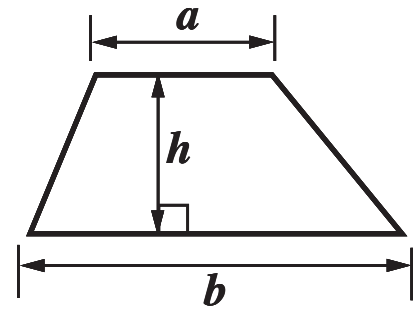
- **Write your name, centre number and candidate number in the boxes on the first page. Please write clearly and in capital letters.**
- **Use black ink. Pencil may be used for graphs and diagrams only.**
- **Read each question carefully. Make sure you know what you have to do before starting your answer.**
- **Show your working. Marks may be given for a correct method even if the answer is incorrect.**
- **Write your answer to each question in the space provided. Additional paper may be used if necessary but you must clearly show your candidate number, centre number and question number(s).**
- **Answer ALL the questions.**

## **INFORMATION FOR CANDIDATES**

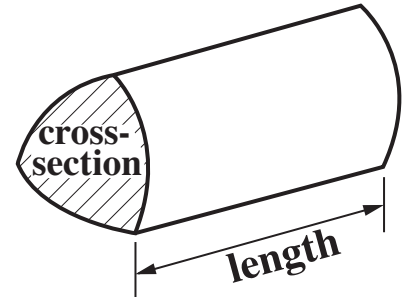
- **The number of marks is given in brackets [ ] at the end of each question or part question.**
- **Section B starts with question 13.**
- **You are expected to use a calculator in Section B of this paper.**
- **Use the  $\pi$  button on your calculator or take  $\pi$  to be 3.142 unless the question says otherwise.**
- **The total number of marks for this Section is 50.**

# FORMULAE SHEET

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



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

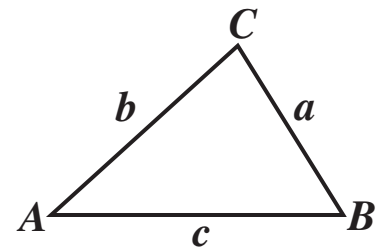


**In any triangle ABC**

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

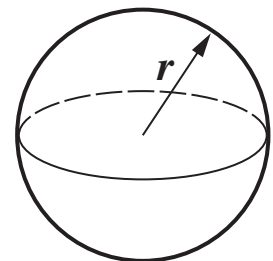
**Cosine rule**  $a^2 = b^2 + c^2 - 2bc \cos A$

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



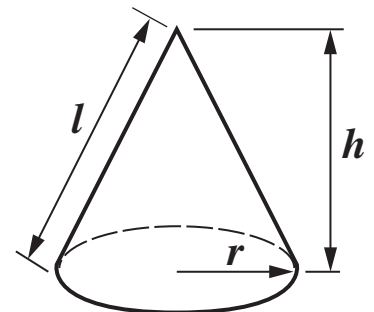
**Volume of sphere** =  $\frac{4}{3}\pi r^3$

**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

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

**13 Cara went to Paris for a weekend break.**

**(a) She caught the train to Paris at 2:30 pm and arrived in Paris at 4:45 pm.**

**The distance by train between London and Paris is 306 miles.**

**(i) Work out the average speed in miles per hour.**

**(a)(i) \_\_\_\_\_ miles per hour [3]**

**(ii) Given that 5 miles is about 8 kilometres, work out the average speed in kilometres per hour.**

**(ii) \_\_\_\_\_ km per hour [2]**

- (b) When Cara returned to London, she had €90 to exchange for pounds.  
The exchange rate was £1 = €1.20.**

**How much did she receive in pounds?**

**(b) £ \_\_\_\_\_ [2]**

- 14 The Mayfield Theatre sells tickets in three price bands. The table shows the standard ticket price for each price band.**

<b>Price band</b>	<b>Standard ticket price</b>
<b>Front stalls</b>	<b>£18</b>
<b>Back stalls</b>	<b>£15</b>
<b>Balcony</b>	<b>£10</b>

- (a) On Saturday the theatre sold 480 standard tickets altogether.**

- 230 standard tickets for the front stalls**
- 165 standard tickets for the back stalls**
- 85 standard tickets for the balcony**

**Calculate the mean price paid for a ticket on Saturday.**

**(a) £ \_\_\_\_\_ [3]**

**(b) On Monday there is a 35% reduction on all ticket prices.**

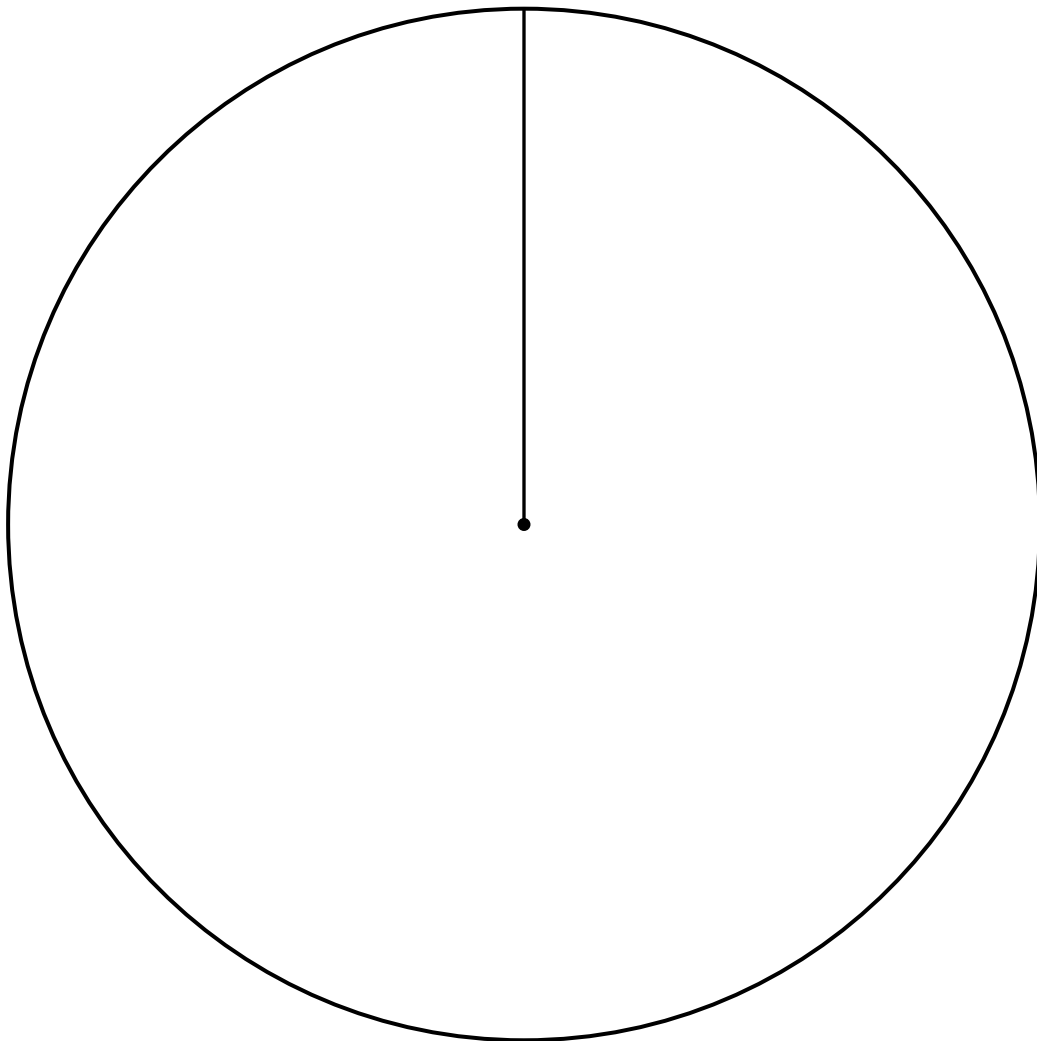
**Calculate the reduced price of a ticket in the front stalls.**

**(b) £ \_\_\_\_\_ [3]**

**(c) On Tuesday the theatre sold 180 tickets altogether.**

- **100 tickets for the front stalls**
- **45 tickets for the back stalls**
- **35 tickets for the balcony**

**Draw a pie chart to show the distribution of the number of tickets sold on Tuesday.**



**[3]**



**15 (a) Expand and simplify.**

**(i)  $10x - 3(2x + 1)$**

**(a)(i) \_\_\_\_\_ [2]**

**(ii)  $(x + 3)^2$**

**(ii) \_\_\_\_\_ [2]**

**(b) Rearrange this formula to make  $x$  the subject.**

**$y = 4x - 7$**

**(b) \_\_\_\_\_ [2]**

**16 A coach company has a special offer.**

**Cheap tickets to London £12 return!  
Usual price £20 return.**

**Altogether the maximum number of tickets for the coach is 50.**

**There will be at least 15 cheap tickets available.**

**The company needs at least £720 from ticket sales.**

**These inequalities represent this information.**

$$x + y \leq 50$$

$$y \geq 15$$

$$20x + 12y \geq 720$$

**(a) What do  $x$  and  $y$  represent in these inequalities?**

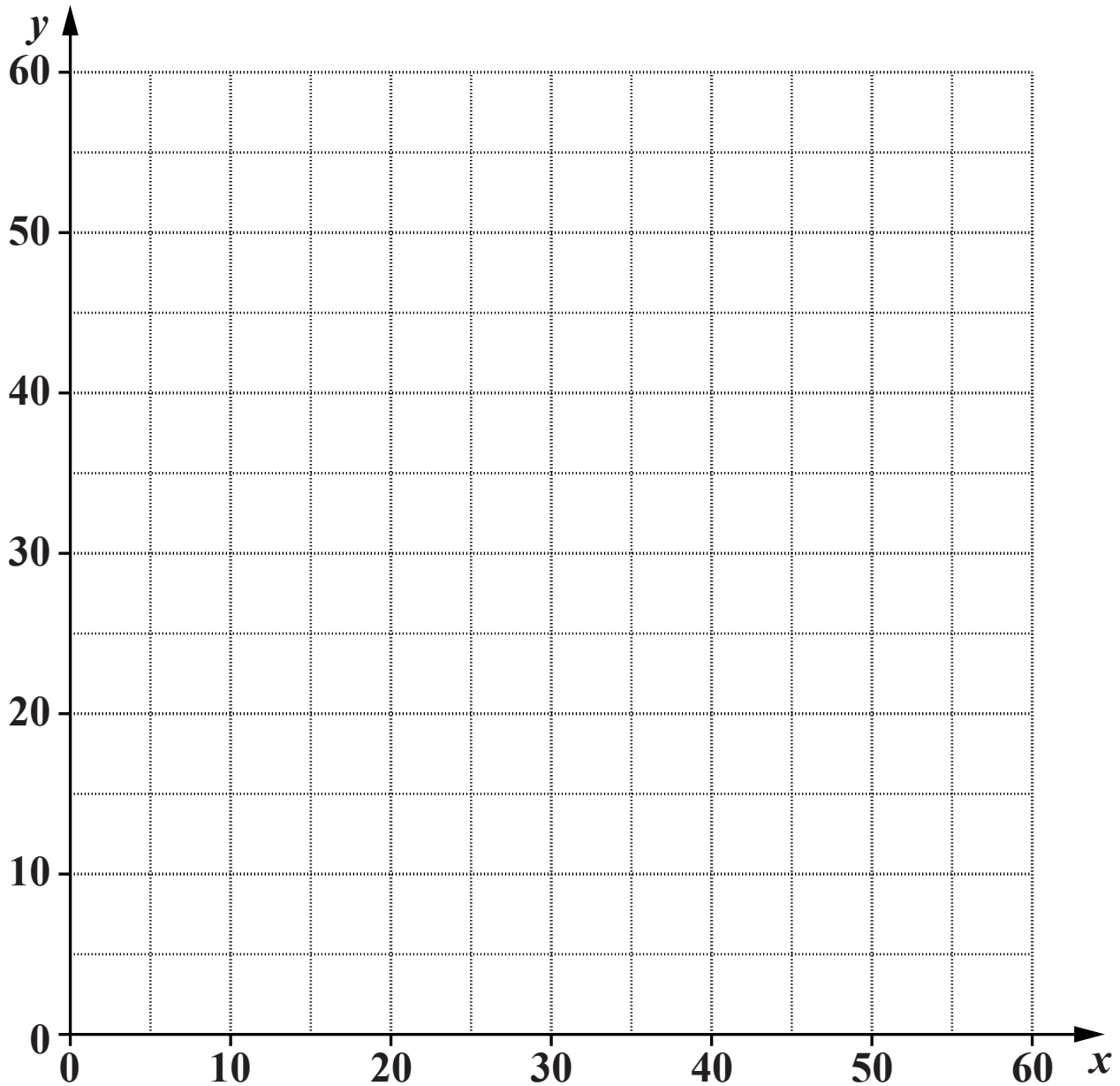
**$x$  represents \_\_\_\_\_**

**$y$  represents \_\_\_\_\_ [1]**

**(b) (i) Draw these graphs on the axes below.**

$$x + y = 50 \quad y = 15 \quad 20x + 12y = 720 \quad [4]$$

**(ii) Label the region R which represents all possible combinations of ticket sales. [1]**



**17 The distance from the Earth to the Sun is  $1.495 \times 10^8$  km. Assume that in one year (365 days) the Earth travels round the Sun in a circle.**

**(a) Find the distance travelled by the Earth in a year. Give your answer in standard form, correct to 3 significant figures.**

**(a) \_\_\_\_\_ km [3]**

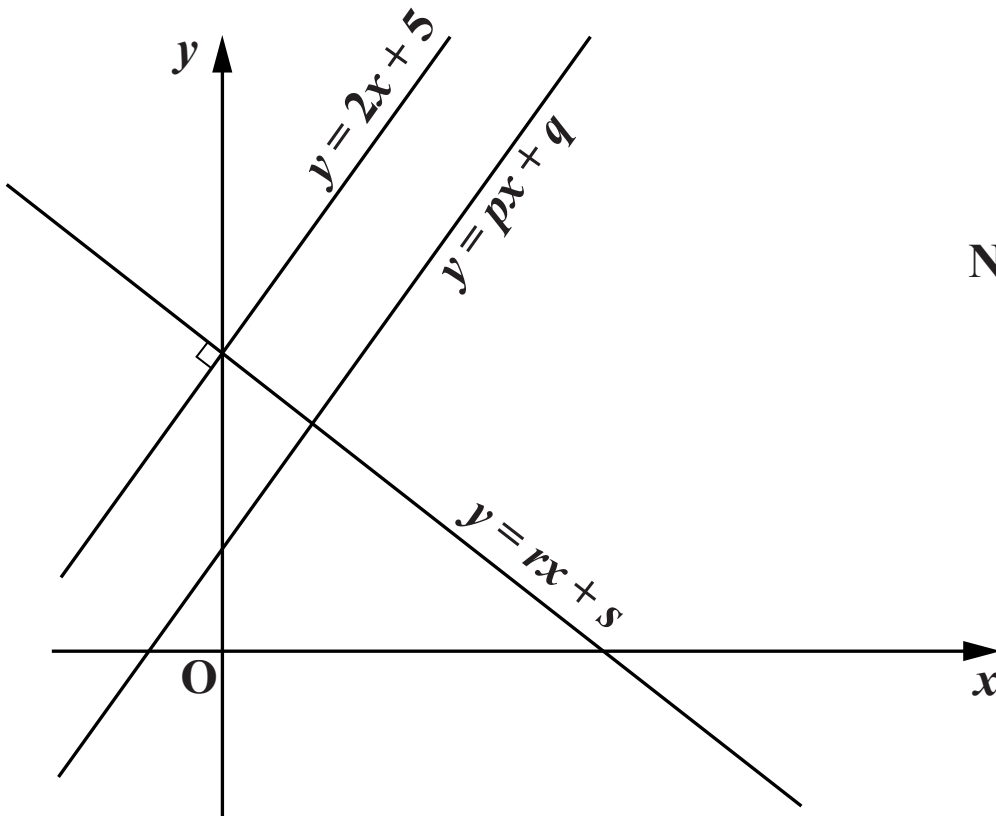
**(b) Find the speed of the Earth in its journey around the Sun. Give your answer in kilometres per hour.**

**(b) \_\_\_\_\_ km per hour [3]**

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**TURN OVER FOR QUESTION 18**

18 This is a sketch graph of three lines.



NOT TO SCALE

(a) The line  $y = px + q$  is parallel to the line  $y = 2x + 5$ .

What can you state about  $p$  and  $q$ ?

$p$  \_\_\_\_\_

$q$  \_\_\_\_\_ [2]

(b) The line  $y = rx + s$  is perpendicular to the line  $y = 2x + 5$ .

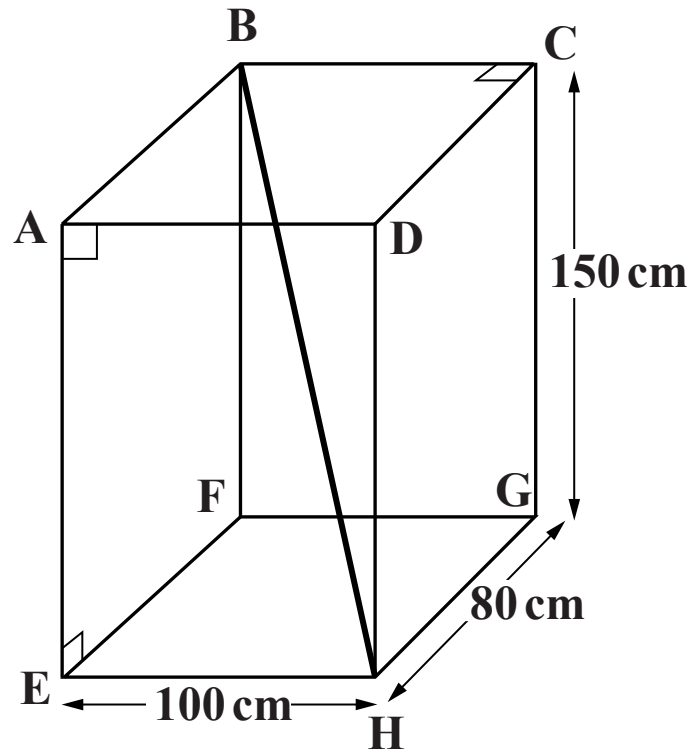
These two lines intersect on the  $y$ -axis.

What can you state about  $r$  and  $s$ ?

$r$  \_\_\_\_\_

$s$  \_\_\_\_\_ [2]

- 19 This diagram shows the framework of a scaffold tower. The tower is in the shape of a cuboid. BH is a strengthening bar.



- (a) Calculate the length BH.

(a) \_\_\_\_\_ cm [3]

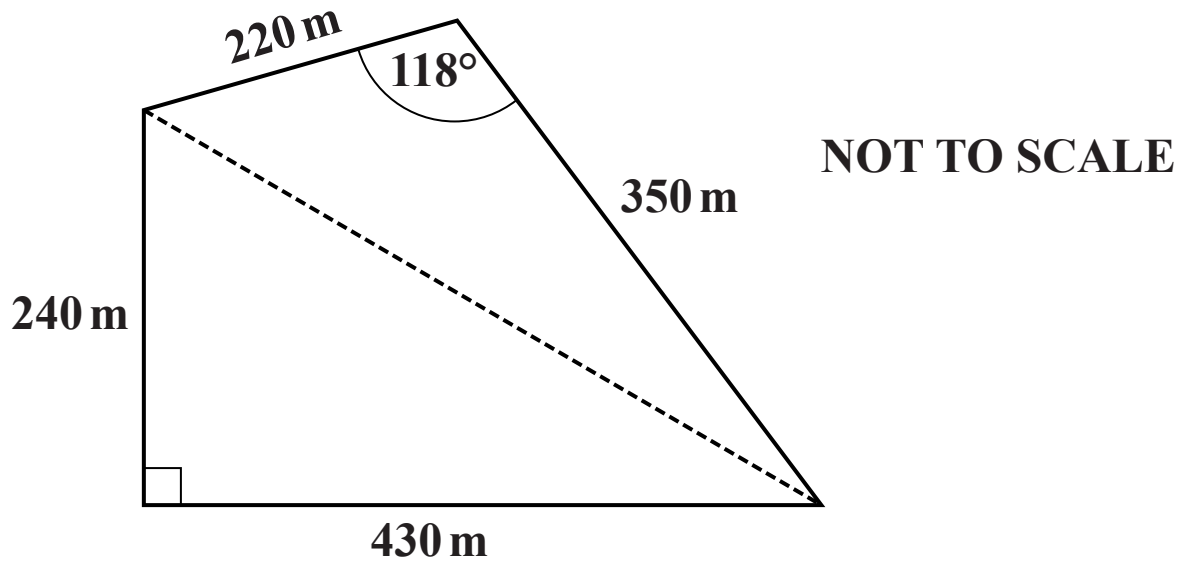


**(b) Calculate the angle that BH makes with the horizontal.**

**(b) \_\_\_\_\_° [3]**

**TURN OVER FOR QUESTION 20**

**20 Mike is buying this field.**



**The land costs £16 100 per hectare.  
1 hectare = 10 000 m<sup>2</sup>.**

**Calculate how much he pays for this field.**

**£ \_\_\_\_\_ [6]**

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