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GENERAL CERTIFICATE OF SECONDARY EDUCATION
MATHEMATICS C (GRADUATED ASSESSMENT)
 Terminal Paper (Section B) (Higher Tier)

B282B

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

Monday 6 June 2011
Afternoon
 Duration: 1 hour



Candidate forename		Candidate surname	
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Centre number						Candidate number			
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INSTRUCTIONS TO CANDIDATES

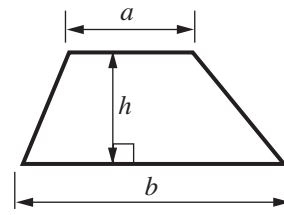
- Write your name, centre number and candidate number in the boxes above. Please write clearly and in capital letters.
- Use black ink. Pencil may be used for graphs and diagrams only.
- Read each question carefully. Make sure you know what you have to do before starting your answer.
- Show your working. 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.
- Do **not** write in the bar codes.

INFORMATION FOR CANDIDATES

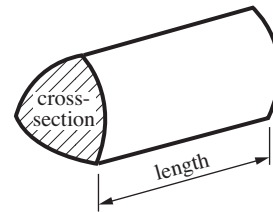
- The number of marks is given in brackets [] at the end of each question or part question.
- Section B starts with question 13.
- You are expected to use a calculator in Section B of this paper.
- Use the π button on your calculator or take π to be 3.142 unless the question says otherwise.
- The total number of marks for this Section is **50**.
- This document consists of **12** pages. Any blank pages are indicated.

Formulae Sheet

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



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

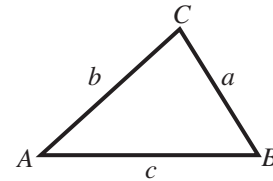


In any triangle ABC

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

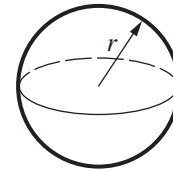
Cosine rule $a^2 = b^2 + c^2 - 2bc \cos A$

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



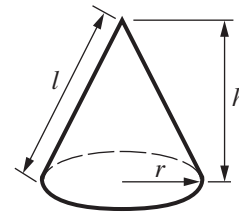
Volume of sphere = $\frac{4}{3}\pi r^3$

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

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

PLEASE DO NOT WRITE ON THIS PAGE

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 $\text{£}1 = \text{€}1.20$.

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.

Price band	Standard ticket price
Front stalls	£18
Back stalls	£15
Balcony	£10

- (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.

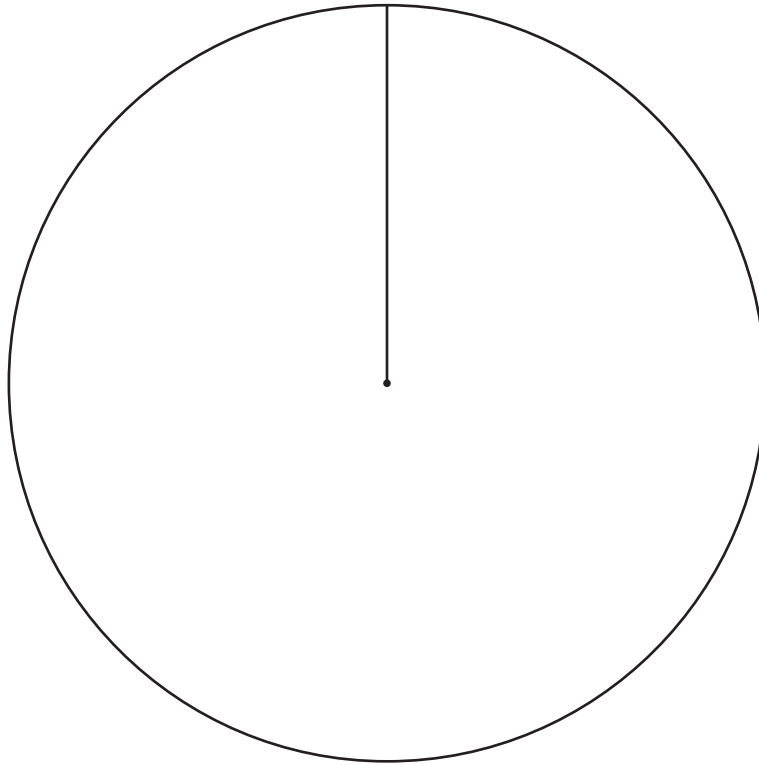
Calculate the reduced price of a ticket in the front stalls.

(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.

$$x + y \leq 50 \quad y \geq 15 \quad 20x + 12y \geq 720$$

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

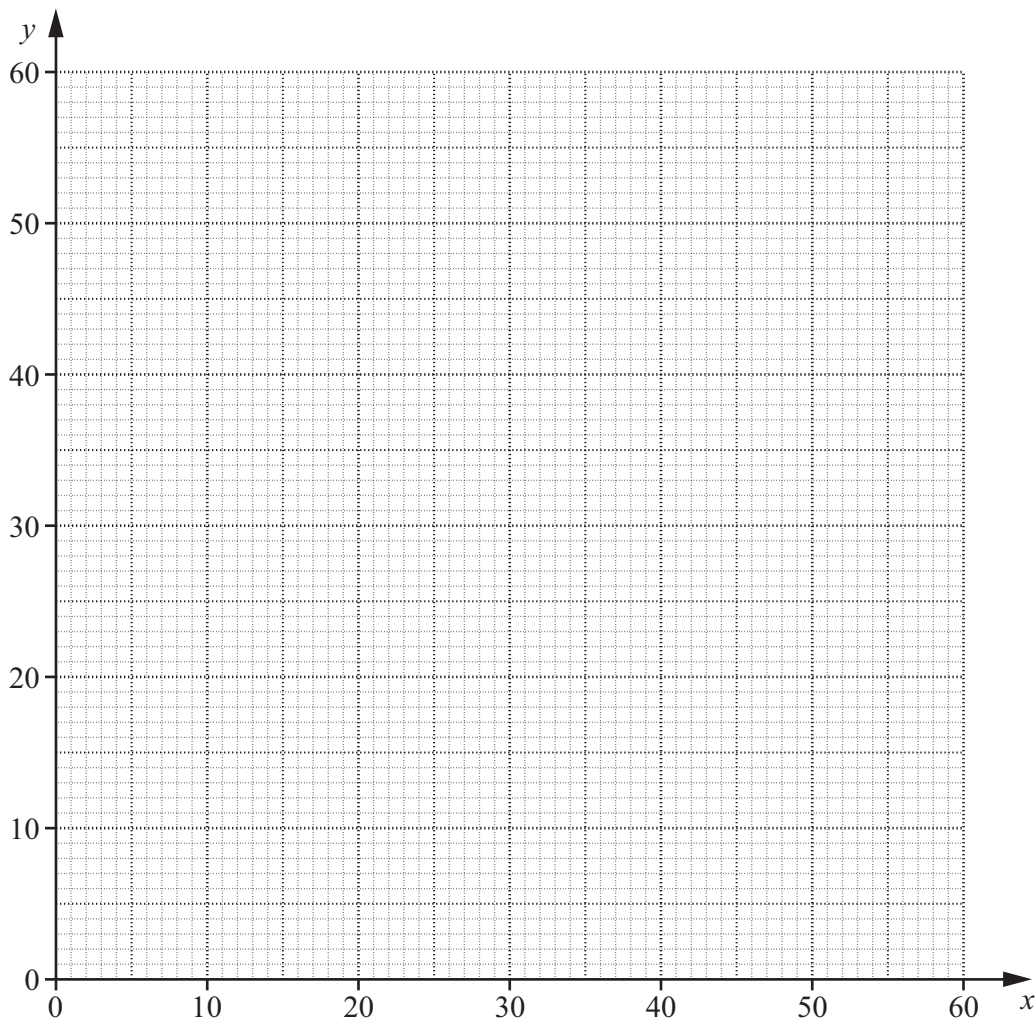
x represents

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 1.495×10^8 km.
Assume that in one year (365 days) the Earth travels round the Sun in a circle.

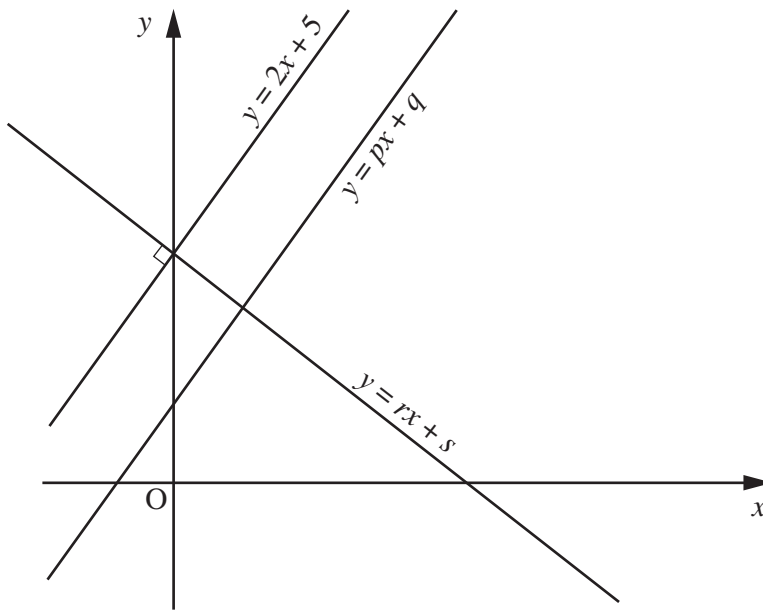
- (a) Find the distance travelled by the Earth in a year.
Give your answer in standard form, correct to 3 significant figures.

(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]

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]

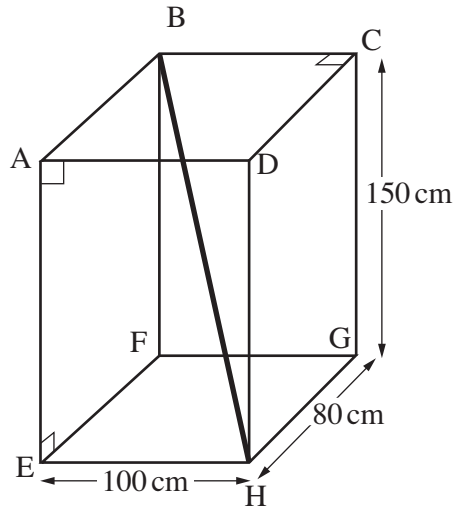
(b) The line $y = rx + s$ is perpendicular to the line $y = 2x + 5$.
These two lines intersect on the y -axis.

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.



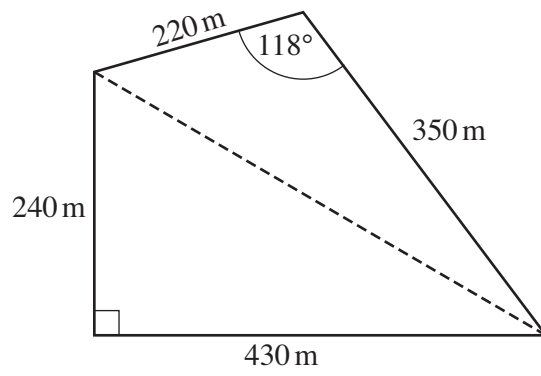
- (a) Calculate the length BH.

(a) cm [3]

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

(b)° [3]

20 Mike is buying this field.



Not to scale

The land costs £16 100 per hectare.
1 hectare = 10 000 m².

Calculate how much he pays for this field.

£ [6]

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