

Wednesday 11 January 2012 – Morning

GCSE MATHEMATICS B (MEI)

B293A Paper 3 Section A (Higher Tier)

Candidates answer on the Question Paper.

OCR supplied materials:

None

Other materials required:

- Geometrical instruments
- Tracing paper (optional)

Duration: 45 minutes



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. HB pencil may be used for graphs and diagrams only.
- Answer **all** the questions.
- 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).
- Do **not** write in the bar codes.

INFORMATION FOR CANDIDATES

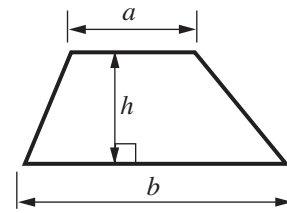
- The number of marks is given in brackets [] at the end of each question or part question.
- The total number of marks for this Section is **36**.
- This document consists of **12** pages. Any blank pages are indicated.

WARNING

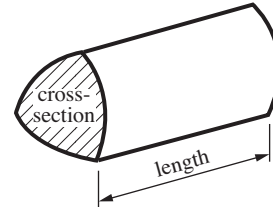
No calculator can be used for Section A of this paper

Formulae Sheet: Higher Tier

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



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

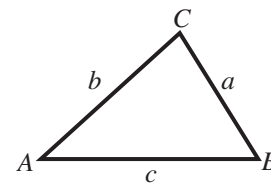


In any triangle ABC

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

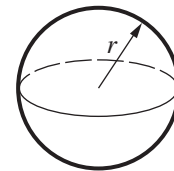
Cosine rule $a^2 = b^2 + c^2 - 2bc \cos A$

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



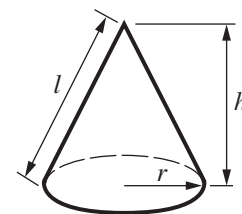
Volume of sphere = $\frac{4}{3}\pi r^3$

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

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

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- 1 (a) Estimate the following.

$$\frac{63 \times 111}{49}$$

Show clearly the values you use.

(a) [2]

- (b) Mrs Smith buys a number of identical cakes for her son's birthday party.
She cuts each cake into 8 equal parts.
There are 35 children at the party.

What is the minimum number of cakes Mrs Smith needs to buy so that every child gets a piece of cake?

(b) [2]

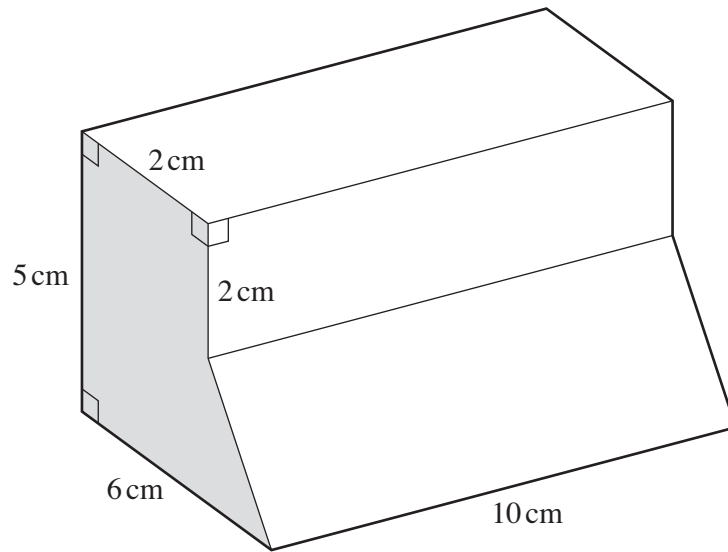
- 2 Joshua wins £500 in a lottery draw.
He decides to share the money between his two sons, Adam and Benjamin, in the ratio of their ages.
Adam is 3 years old and Benjamin is 7 years old.

How much does each receive?

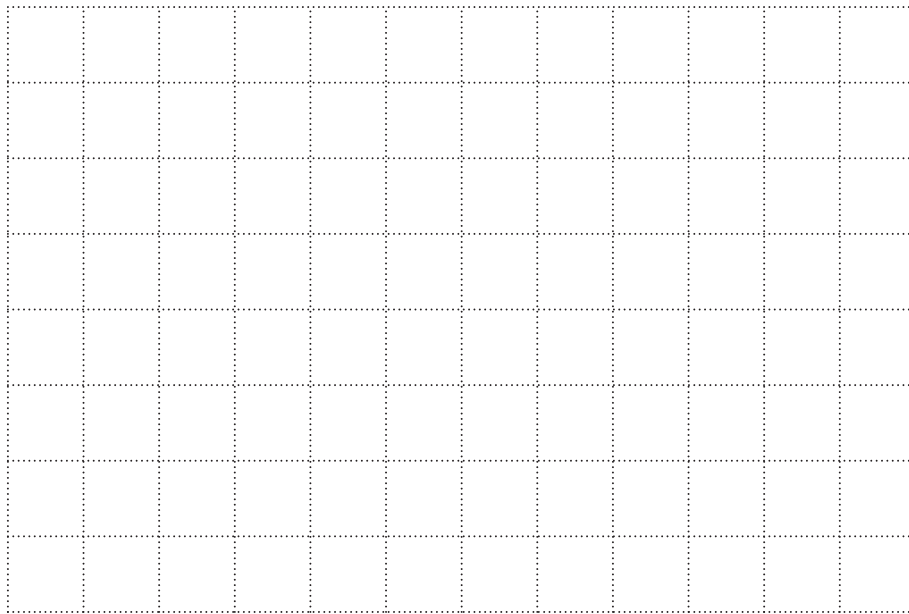
Adam: £

Benjamin: £..... [3]

- 3 Here is a prism.
The cross-section is shaded.



- (a) On the grid, draw accurately the cross-section of the prism.

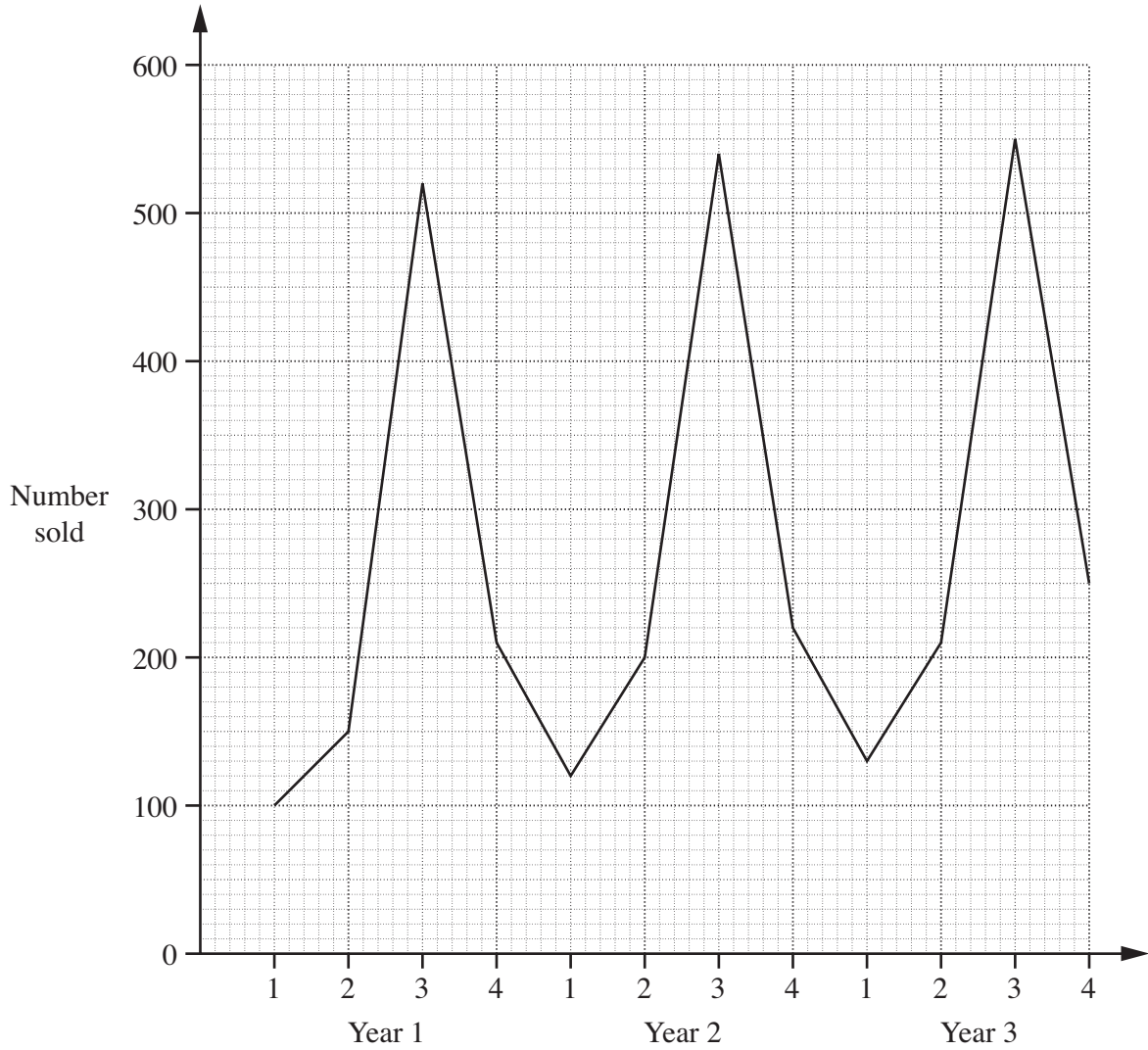


[2]

- (b) Find the volume of the prism.

(b) cm³ [3]

- 4 A chemist recorded the number of bottles of suntan oil sold in each quarter for three years. Here is the graph for these data.



- (a) Explain how the graph indicates a seasonal variation in the sales of suntan oil.

.....
 [1]

- (b) Describe the overall trend of these data.

.....
 [1]

5 (a) Solve this equation.

$$4x + 3 = 8 - x$$

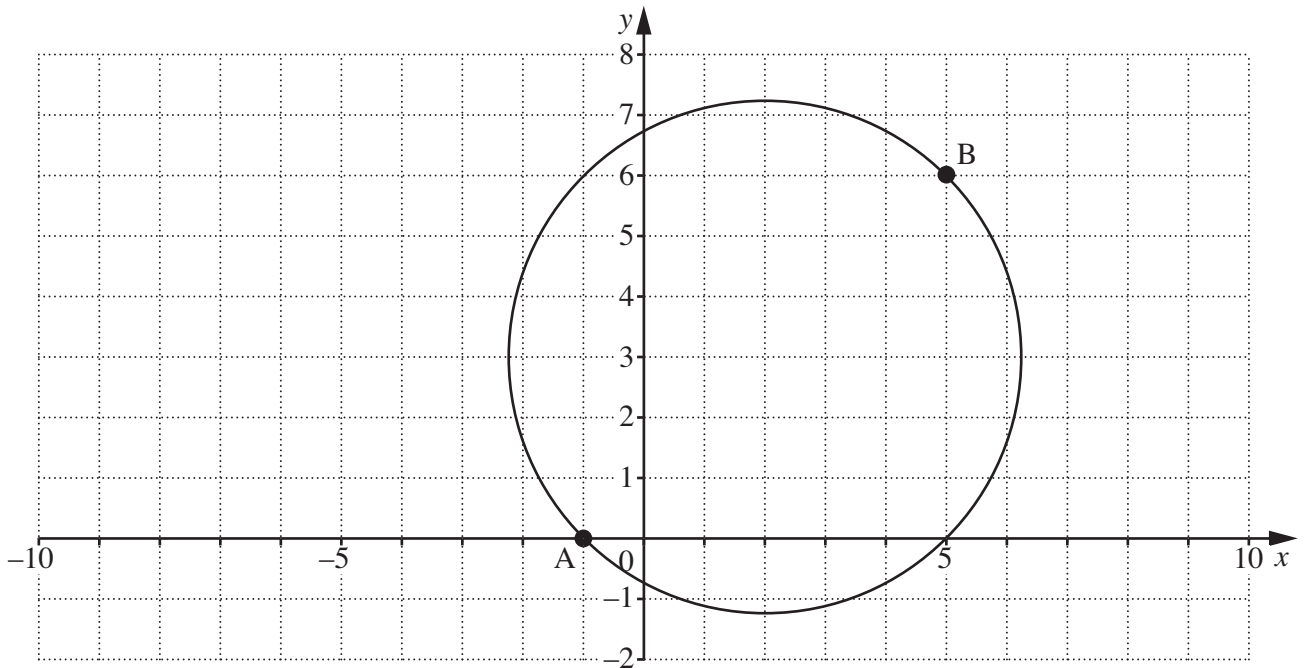
(a) [3]

(b) Simplify this expression.

$$5x - 11 - 2(x + 2)$$

(b) [3]

- 6 AB is a diameter of the circle shown.
A is the point $(-1, 0)$ and B is the point $(5, 6)$.



Calculate the radius of the circle.
Give your answer in the form $a\sqrt{2}$.

..... [3]

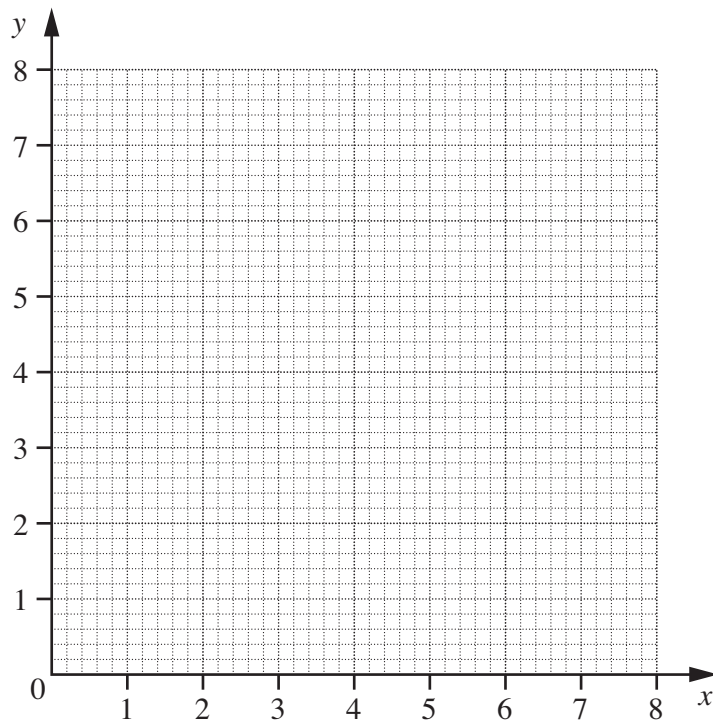
7 (a) Solve algebraically these simultaneous equations.

$$\begin{aligned} 3x + 4y &= 24 \\ 2y &= x + 2 \end{aligned}$$

(a) $x = \dots\dots\dots$

$y = \dots\dots\dots$ [3]

(b) Draw the lines representing the two equations to illustrate your answer to part (a).



[3]

TURN OVER FOR QUESTION 8

8 (a) Show that $\frac{n}{n-1} - \frac{n+1}{n} = \frac{1}{n(n-1)}$.

[4]

(b) Hence solve the equation $\frac{n}{n-1} - \frac{n+1}{n} = \frac{1}{2}$.

(b) [3]

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