

GENERAL CERTIFICATE OF SECONDARY EDUCATION

MATHEMATICS A

A501/02

Unit A (Higher Tier)

Candidates answer on the question paper.

OCR supplied materials:
None

Other materials required:

- Scientific or graphical calculator
- Geometrical instruments
- Tracing paper (optional)

Wednesday 9 November 2011

Afternoon

Duration: 1 hour



Candidate forename		Candidate surname	
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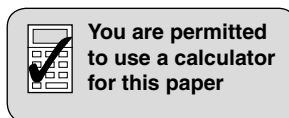
Centre number						Candidate number				
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INSTRUCTIONS TO CANDIDATES

- 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.
- Your answers should be supported with appropriate 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

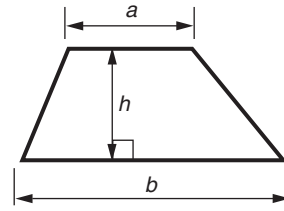
- The number of marks is given in brackets [] at the end of each question or part question.
- The total number of marks for this paper is **60**.
- This document consists of **16** pages. Any blank pages are indicated.



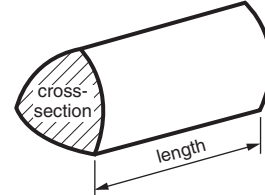
This paper has been pre modified for carrier language

Formulae Sheet: Higher Tier

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



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

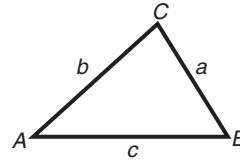


In any triangle ABC

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

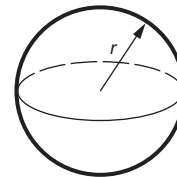
Cosine rule $a^2 = b^2 + c^2 - 2bc \cos A$

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



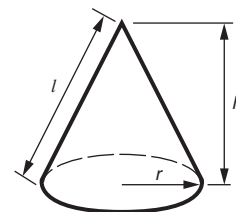
Volume of sphere = $\frac{4}{3}\pi r^3$

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

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

PLEASE DO NOT WRITE ON THIS PAGE

- 1 (a) Debi makes bread.
She always uses brown flour and white flour in the ratio 2 : 1.

(i) For a medium loaf of bread she needs 420 g of flour altogether.

How much brown flour does she need for a medium loaf?

(a)(i) _____ g [2]

(ii) For a large loaf she uses 360 g of brown flour.

How much flour does she use altogether for a large loaf?

(ii) _____ g [2]

- (b) Tim makes a medium loaf using wholemeal flour and white flour.
He uses 260 g of wholemeal flour and 160 g of white flour.

Write the ratio

wholemeal flour : white flour

that Tim uses.

Give your answer in its simplest form.

(b) _____ [2]

2 (a) Multiply out.

$$3(2a - 5)$$

(a) _____ [2]

(b) Factorise.

$$b^2 + 7b$$

(b) _____ [1]

3 (a) Calculate.

$$\sqrt{6.4^2 - 4 \times 9.03}$$

(a) _____ [1]

(b) (i) Write 540 as the product of its prime factors.

(b)(i) _____ [3]

(ii) Find the LCM (least common multiple) of 540 and 50.

(ii) _____ [2]

- 4 Use a pair of compasses and a ruler to answer this question.
Do not rub out your construction lines.

The scale drawing shows two schools, Ashton (A) and Bedward (B).

Scale: 2 cm represents 1 mile



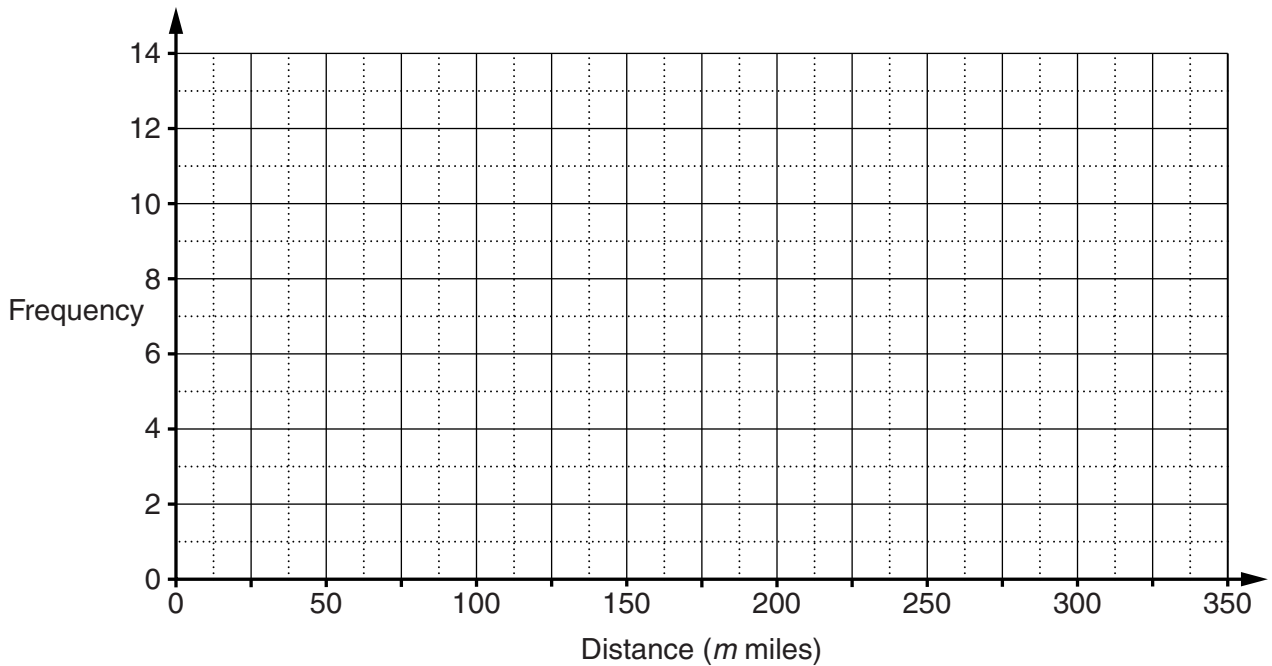
Students who go to Ashton School live 3 miles or less from the school.

Construct and shade the area where students can live who go to Ashton School even though they live nearer to Bedward School. **[5]**

- 5 Mukulika asked 50 drivers how many miles they had travelled that day. This table summarises their responses.

Distance (m miles)	Frequency
$0 < m \leq 50$	7
$50 < m \leq 100$	10
$100 < m \leq 150$	14
$150 < m \leq 200$	9
$200 < m \leq 250$	5
$250 < m \leq 300$	3
$300 < m \leq 350$	2

- (a) Draw a frequency polygon to represent this information.



[3]

- (b) Calculate an estimate of the mean distance travelled.

(b) _____ miles [4]

Turn over

6 Solve.

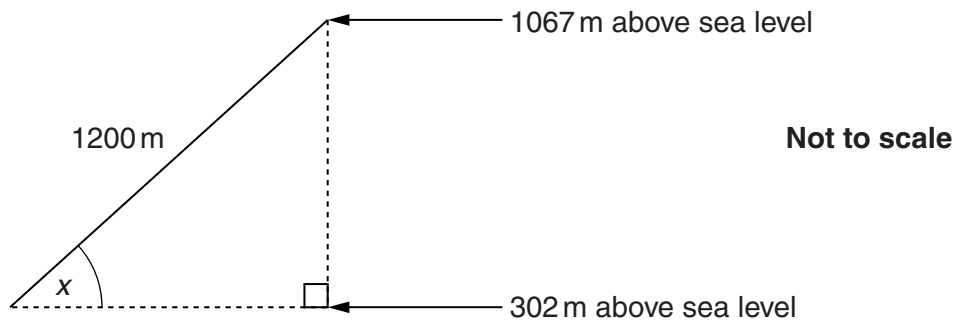
(a) $10x - 7 = 2x + 3$

(a) _____ [3]

(b) $7(5 - 2x) = 0$

(b) _____ [3]

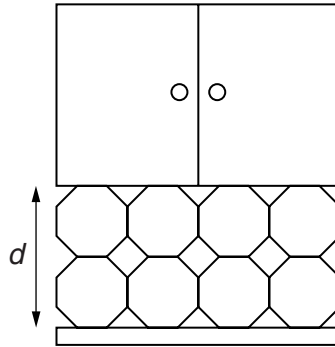
- 7 The cable car which goes up Table Mountain starts at a height of 302 m above sea level. It goes to the top of the mountain at 1067 m above sea level. The length of the cable is 1200 m.



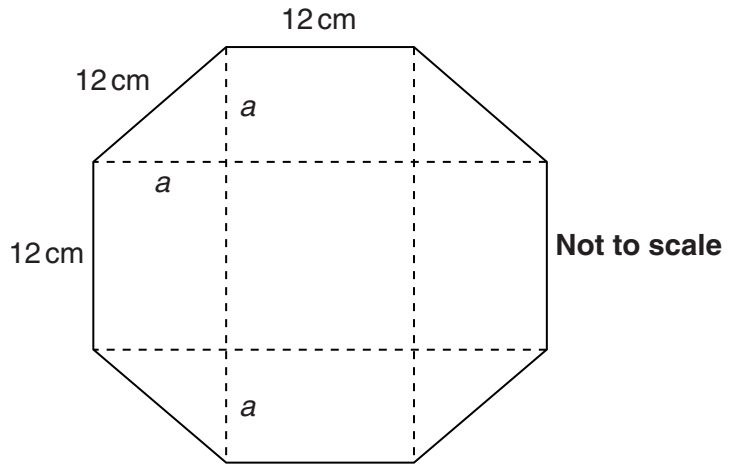
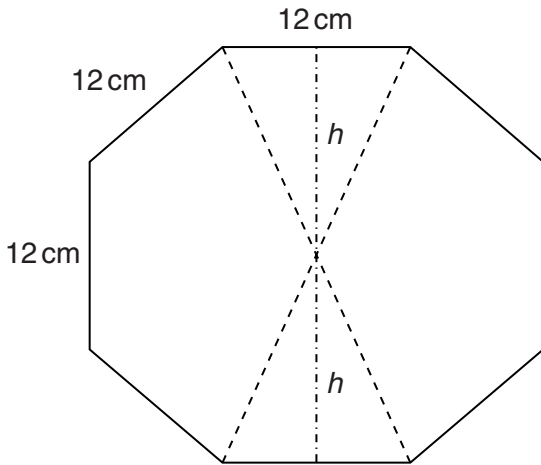
Calculate x , the angle that the cable makes with the horizontal.

_____ ° [4]

- 8 A tile is a regular octagon of side 12 cm.
 Jo will use two rows of these tiles, with some square tiles, in her kitchen between the worktop and the wall cupboards.



Calculate d , the distance between the worktop and the wall cupboards.
 These diagrams show some possible ways of splitting up an octagon which you may find helpful.



_____ cm [6]

9 You are given that $f(x) = 7 - 2x$.

(a) Find $f(6)$.

(a) _____ [1]

(b) Solve $f(x) = 0$.

(b) _____ [1]

(c) Express $f(3 + x)$ in the form $a + bx$.

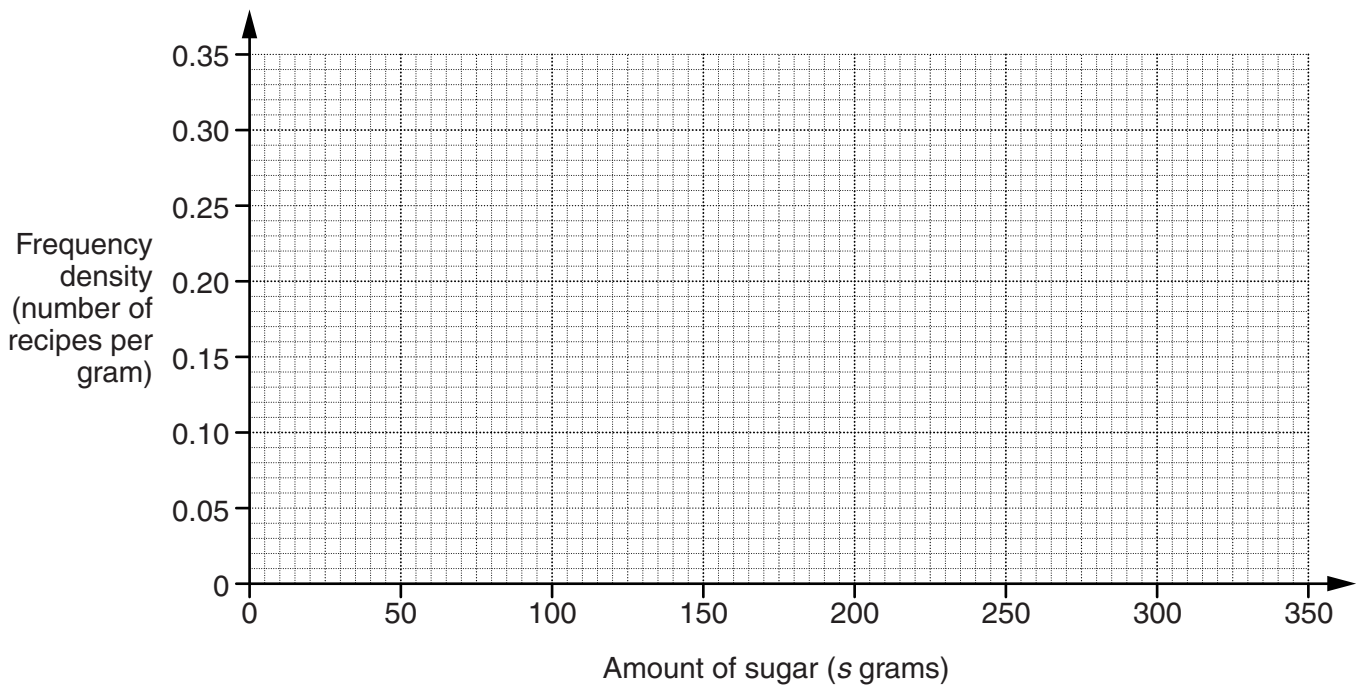
(c) _____ [2]

10 Sita recorded the amount of sugar and fat in each of 50 cake recipes.

(a) This table summarises her results for the amount of sugar in each recipe.

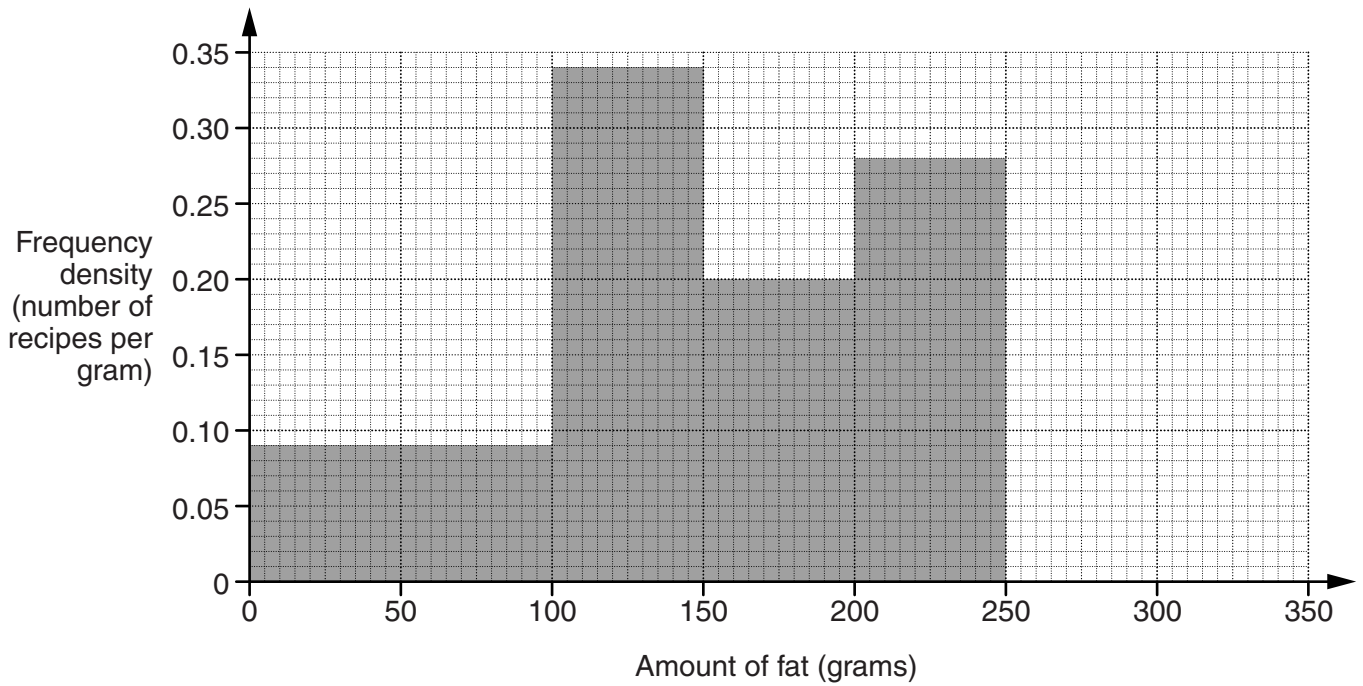
Amount of sugar (s grams)	Frequency
$0 \leq s < 100$	10
$100 \leq s < 150$	15
$150 \leq s < 200$	10
$200 \leq s < 250$	14
$250 \leq s < 350$	1

Draw a histogram to represent this information.



[3]

(b) This histogram summarises her results for the amount of fat in each recipe.



(i) What does the histogram show about the amount of fat in the recipe containing the most fat?

_____ [1]

(ii) How many recipes contained less than 100g of fat?

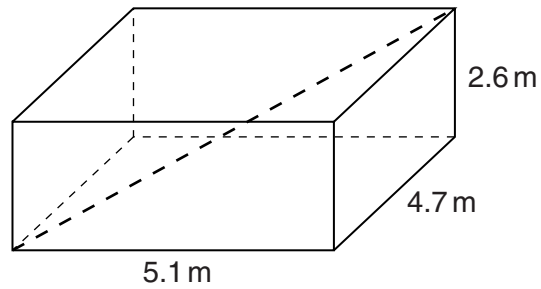
(b)(ii) _____ [1]

11 Rearrange to make p the subject.

$$C + 5p = a(C - p)$$

[4]

- 12 Shirley and Jay are in a room which is a cuboid 5.1 m by 4.7 m by 2.6 m.



- (a) Shirley estimates the length of the diagonal of the room (shown on the diagram) to be 13 m.

Jay says:

You are wrong! $5.1 + 4.7 + 2.6$ is 12.4. That's less than 13.

Explain why Jay's reasoning shows that the diagonal is less than 13 m.

[1]

- (b) Calculate the actual length of the diagonal of the room.

(b) _____ m [3]

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