



Wednesday 5 November 2014 – Morning

GCSE 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)

Duration: 1 hour



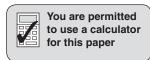
Candidate forename				Candidate surname				
Centre number					Candidate nu	ımber		

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.
- 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).
- Do not write in the bar codes.

INFORMATION FOR CANDIDATES

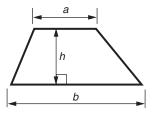
- The number of marks is given in brackets [] at the end of each question or part question.
- The total number of marks for this paper is 60.
- This document consists of 16 pages. Any blank pages are indicated.



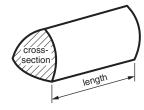


Formulae Sheet: Higher Tier

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



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

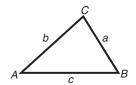


In any triangle ABC

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 =
$$\frac{1}{2}ab\sin C$$



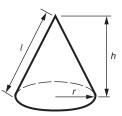
Volume of sphere = $\frac{4}{3}\pi r^3$

Surface area of sphere = $4\pi r^2$



Volume of cone = $\frac{1}{3}\pi r^2 h$

Curved surface area of cone = πrl



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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		Answer all the	questions.
1	(a)	Express the ratio 5 : 7 in the form 1 : <i>n</i> .	
			(a)[1]
	(b)	Express this ratio in its simplest form. 56 minutes : 2 hours	
			(b)[3]

Turn over © OCR 2014

2	(a)	Calculate.
_	(a)	Calculate.

$$\sqrt{\frac{12.75}{9.6 \times 0.54}}$$

Give your answer correct to 2 decimal places.

a)[2
-----	---

(b) Insert one pair of brackets to make this calculation correct.

$$12 - 1 + 4 \times 3 = -3$$
 [1]

3 Colin takes 40 strokes to swim 50 m. Des takes 32 strokes to swim 50 m.

On average, how much further does Des swim in one stroke than Colin?

..... m [2]

4 Here are the first four patterns in a sequence.

Pattern 1	Pattern 2	Pattern 3	Pattern 4				
• • •	• • • •	• • • •	• • • • •				
• • •	• • • •	• • • • •	• • • • • •				
• • •	• • • •	• • • • •	• • • • • •				

(a) How many dots are there in Pattern 10?

(a)[1	[]
-------	----

(b) Write an expression for the number of dots in Pattern n.

5 In this question, you should use a ruler and a pair of compasses. Do not rub out your construction lines.

The scale drawing shows two warning posts, A and B, on rocks at sea. It also shows the position of a buoy, C.

• B

A •

c

Scale: 1 cm represents 50 m

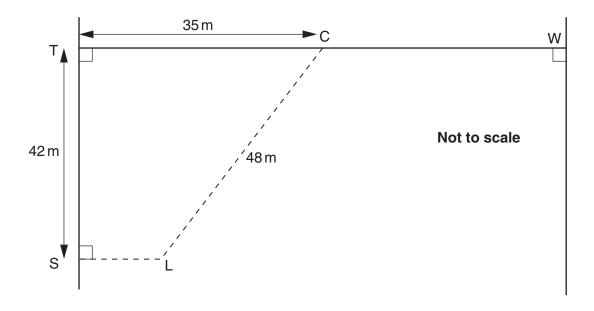
For safety, boats should follow a course that keeps the same distance from A as from B. The buoy at C makes a sound which can be heard up to 250 m away.

Construct the safe course for boats. Indicate clearly the part of the safe course where the sound from buoy C can be heard.

[4]

6	Two numbers have a least common multiple (LCM) of 750. One of the numbers is 150. The other number is between 100 and 140.									
	Find	d this number.								
				[3]						
7	(a)	Solve this equation.								
		5x - 4 = 3x + 7								
			(a)	[3]						
	(b)	Factorise fully.								
		$7y^2 - 14y$								
			(b)	[2]						

- 8 Leigh plays rugby and is about to kick the ball towards goal.
 - (a) He is standing at L.L is 48 m from the centre C of the goal, and 42 m from the line TW.The distance TC is 35 m.



(i) Calculate LS, the shortest distance from Leigh to the line ST.

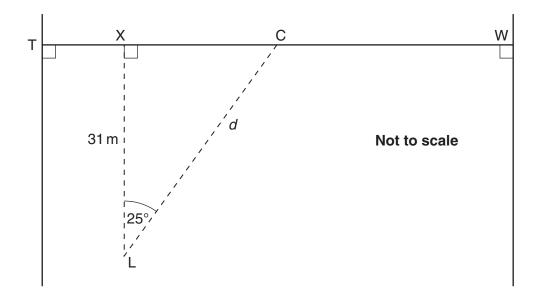
(a)(i)	m	[4]
(a)(1)		1.71

(ii) Calculate angle TCL.

(ii)° [3]

(b) Later in the game, Leigh has another kick towards goal.

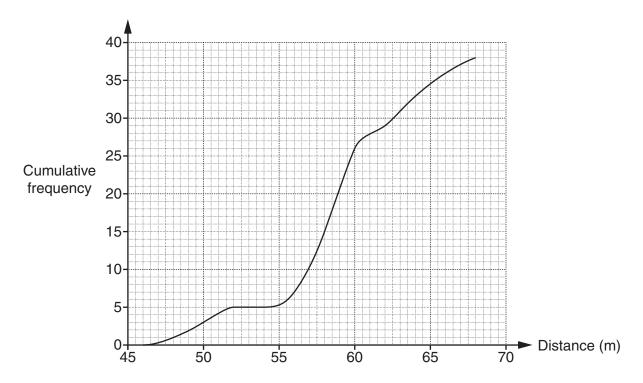
This time, he is standing 31 m from the line TW and the angle XLC is 25°.

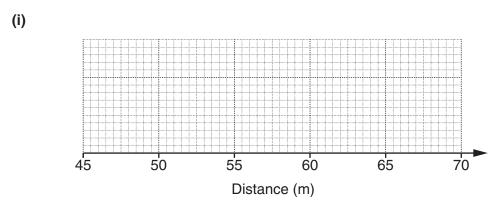


Calculate the distance, *d*, between Leigh and the centre of the goal.

(b) m [3]

9 (a) This cumulative frequency graph represents the distances thrown by the 38 women in the qualifying round of the javelin at the 2012 Olympics.





On the grid above, construct a box plot to represent the distribution of the distances thrown by the 38 women. [3]

(i	i) Here are some statistics for the distances thrown by the men in the qualifying round of the javelin at these Olympics.
	median 78.7 m interquartile range 7.0 m range 17.2 m
	Jodie says:
	"The distances thrown by the men were more consistent than the distances thrown by the women."
	Is Jodie correct?
	State the values of the statistics that you use to support your decision.
	because
	[2]
(b)	In the 50 km walking race for men, the winner finished in a time of 3 h 35 m 59 s. The slowest man who finished had a time of 4 h 15 m 05 s.
	How many seconds slower was he than the winner?
	(b) seconds [2]

10	(a) F	Find	the coordinates of the midpoint of the line joi	ning the points (5, 2) and (-3, 7).
				(a) () [2]
	(b)	(i)	For $d = 6t^2 + 4$, find the value of d when $t =$	= -3.
				(b)(i)[2]
		(ii)	Rearrange this formula to make t the subjection $d = 6t^2 + 4$	ct.
				(ii)[3]

(c)	Write a	number in	each box	so that the	following is	an identity.
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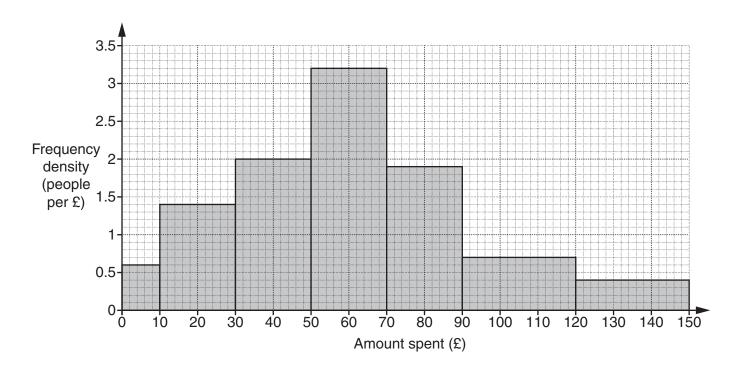
$$4x - 3 + 6(x - 5) = 7x - 1 + \boxed{ x - }$$
 [2]

- (d) You are given that f(x) = 5 2x.
 - (i) Find x when f(x) = 0.

(ii) Find f(t + 4). Express your answer in the form a + bt.

(ii)[2]

11 This histogram shows the distribution of the amounts spent on fuel at a petrol station one day.



(a) Estimate how many people spent over £100.

(2))	[J	٦
lai	/	12	

(b) Complete the frequency table and use it to calculate an estimate of the mean amount spent on fuel at the petrol station that day.

Amount spent (£a)	Frequency
0 < a ≤ 10	6
10 < <i>a</i> ≤ 30	28
30 < a ≤ 50	
50 < a ≤ 70	
70 < a ≤ 90	
90 < <i>a</i> ≤ 120	
120 < <i>a</i> ≤ 150	

(b)) £	5	1
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END OF QUESTION PAPER

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