

GENERAL CERTIFICATE OF SECONDARY EDUCATION
MATHEMATICS B
Higher Tier

H B293/A

MODULAR PAPER – SECTION A

Specimen

Candidates answer on the question paper.

Time: 45 minutes

Additional Materials:

Geometrical instruments
Tracing paper



Candidate Name

Centre Number

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Candidate Number


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INSTRUCTIONS TO CANDIDATES

- Write your name, centre number and candidate number in the boxes above.
- Answer **all** the questions.
- Write your answers, in blue or black ink, in the spaces provided on the question paper. Pencil may be used for graphs and diagrams only.
- Read each question carefully and make sure you know what you have to do before starting your answer.
- Show all your working. Marks may be given for working which shows that you know how to solve the problem, even if you get the answer wrong.
- Do **not** write in the bar code.
- Do **not** write outside the box bordering each page.
- **WRITE YOUR ANSWER TO EACH QUESTION IN THE SPACE PROVIDED. ANSWERS WRITTEN ELSEWHERE WILL NOT BE MARKED.**

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 in this section is 36.

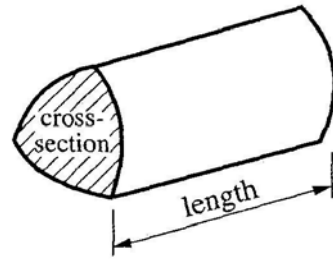
	<p>WARNING You are not allowed to use a calculator in Section A of this paper.</p>
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For Examiner's Use	
Section A	
Section B	
Total	

This document consists of **12** printed pages.

FORMULAE SHEET

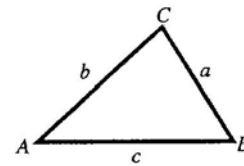
Volume of prism = (area of cross-section) \times length



In any triangle ABC

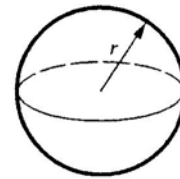
Sine rule $\frac{a}{\sin A} = \frac{b}{\sin B} = \frac{c}{\sin C}$

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



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

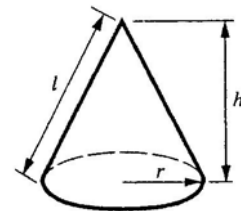
Volume of sphere $\frac{4}{3} \pi r^3$



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

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

- 1 (a) Estimate.

$$104 \times 4.1$$

(a) [1]

- (b) Given

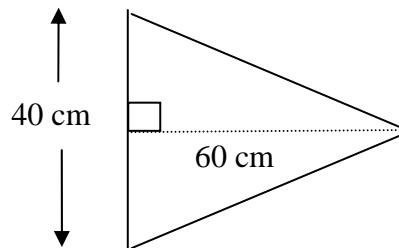
$$98 \times 146 = 14\,308,$$

work out

$$14\,308 \div 980.$$

(b) [1]

- 2 The diagram shows a flag used to mark a hole on a golf course.



Not to scale

- (a) Calculate the area of the flag.

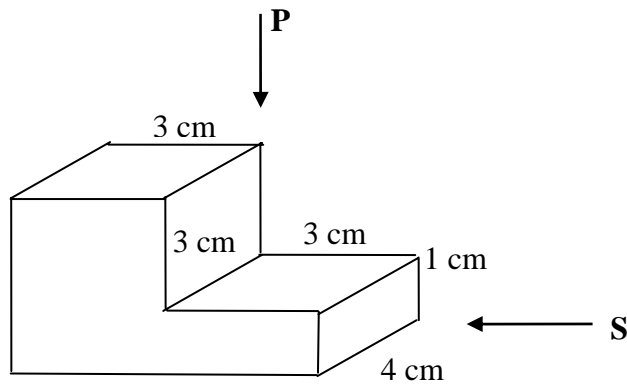
(a) cm^2 [2]

- (b) Convert your answer for part (a) from square centimetres to square metres.

(b) m^2 [2]

[Turn Over

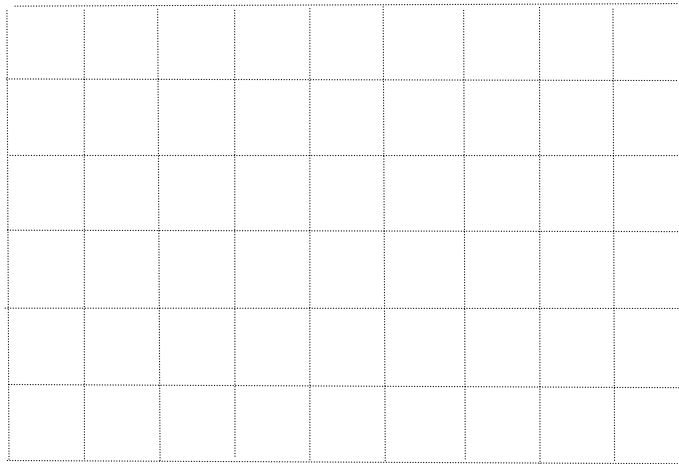
- 3 The diagram shows a small block of wood in the shape of an L-shaped prism. Lengths are centimetres.



Draw full size on the grids below

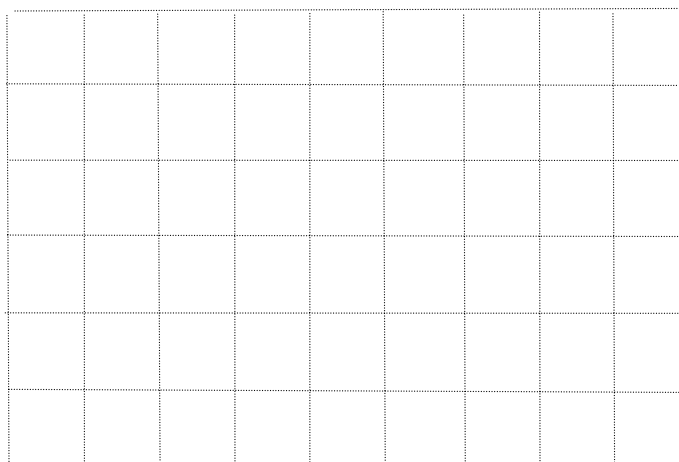
- (a) the plan view from P,

[2]



- (b) the side view from S.

[2]



4

Always odd

Always even

Sometimes odd and
sometimes even

In this question, n stands for an odd number.

Which of the above describes $3n^2$?

Give a reason for your answer.

.....

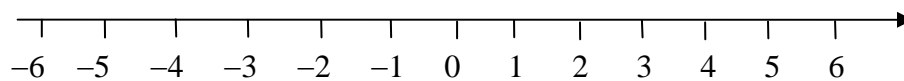
Reason

..... [2]

5 (a) Solve the following inequality.

$$2x + 7 > 13$$

(b) Illustrate your answer on the number line.



[3]

[Turn Over

- 6 (a) Work out $3\frac{1}{4} - 1\frac{4}{5}$, giving your answer as a fraction.

(a) [3]

- (b) The number 298 000 has been rounded to n significant figures.
State the smallest and largest possible values for n .

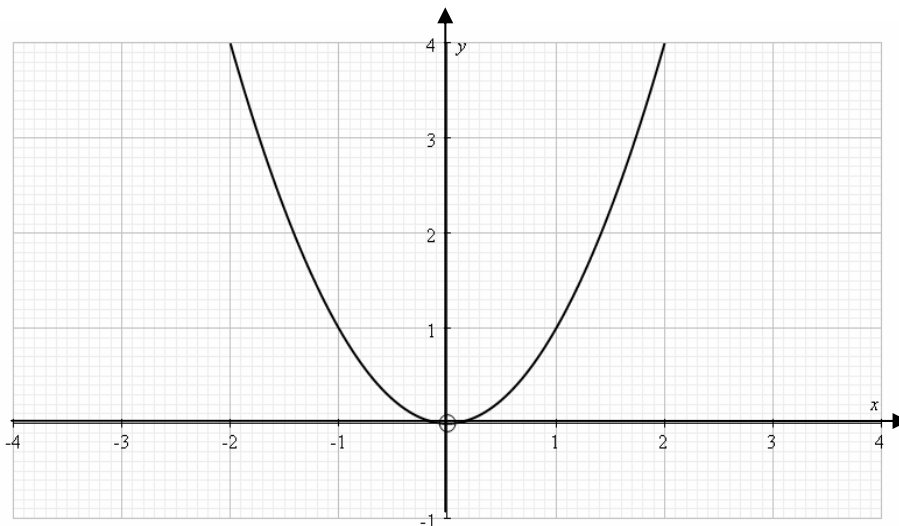
(b) smallest: ; largest: [2]

- (c) Mr Smith splits £5000 between his two sons in the ratio 7: 3.

Work out how much each son gets.

(c) [2]

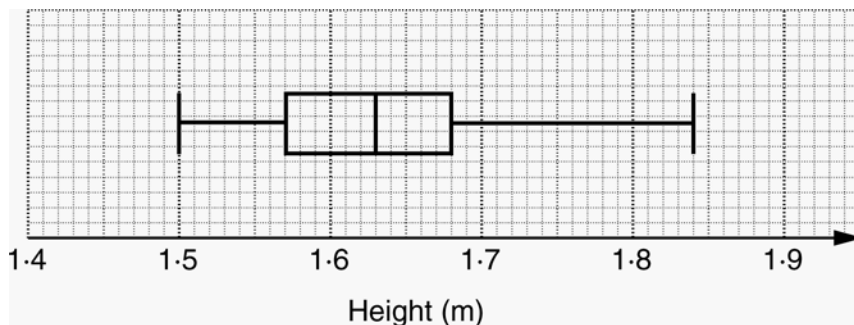
- 7 The graph below is $y = x^2$.



By plotting a suitable line, find the positive root of the equation $x^2 + x - 4 = 0$.

..... [4]

8 This box plot shows the heights of a group of 14-year-old boys.



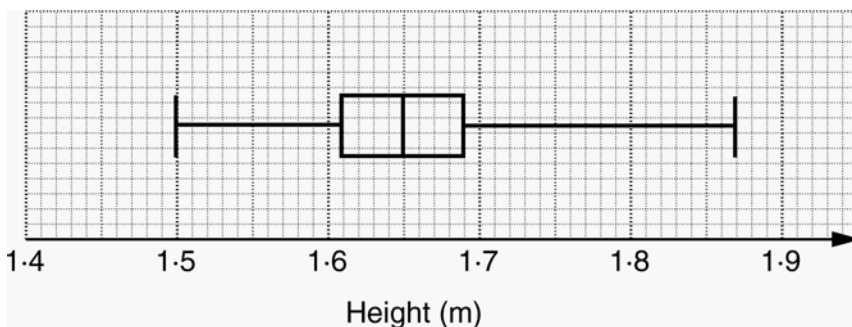
(a) (i) What is the height of the shortest boy?

(a)(i)cm [1]

(ii) What is the median height?

(ii)cm [1]

This box plot shows the heights of a group of 14-year-old girls.



(b) Describe two differences between the heights of the boys and the heights of the girls.

1 [1]

2 [1]

[Turn Over

- 9 (a) Solve the equation $x^2 - 8x - 4 = 0$.
Leave your answer in the form $a \pm b\sqrt{5}$, where a and b are integers.

(a)[3]

- (b) $(x + p)^2 = x^2 - 6x + q$ is an identity.

Find the values of p and q .

(b) $p = \dots\dots\dots$

$q = \dots\dots\dots$ [3]



OXFORD CAMBRIDGE AND RSA EXAMINATIONS

General Certificate of Secondary Education

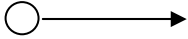
MATHEMATICS B

B293/A

MODULAR PAPER – SECTION A

Specimen Mark Scheme

The maximum mark for this section is 36.

Section A					
1	(a)	$104 \times 4.1 \approx 104 \times 4 = 416$ Accept $100 \times 4 = 400$	B1	2	
	(b)	$\frac{14308}{98} = 146 \Rightarrow \frac{14308}{980} = 14.6$	B1		
2	(a)	Area = $\frac{1}{2} \times 40 \times 60 = 1200$	M1 A1	4	Half base times height
	(b)	$1200\text{cm}^2 = 0.12\text{m}^2$	M1 A1		Divide by 100 twice
3	(a)	Correct plan	B1 B1	4	Rectangle of correct dimensions Line across in correct place
	(b)	Correct side view	B1 B1		Rectangle of correct dimensions Line across in correct place
4		Always odd. This is multiplying three odd numbers together which is odd	B1 B1	2	
5	(a)	$x > 3$	M1 A1	3	Solve inequality Ans
	(b)		B1		Correct illustration for their answer
6	(a)	$3\frac{1}{4} - 1\frac{4}{5} = 3\frac{5}{20} - 1\frac{16}{20} = 3 - 1 - \frac{11}{20}$ $= 1\frac{9}{20}$	B1 M1 A1	7	Common denominator seen Dealing with process of taking away
	(b)	Smallest 3, largest 6	B1 B1		
	(c)	$7 + 3 = 10$ $5000 \times \frac{7}{10} = 3500,$ $5000 \times \frac{3}{10} = 1500$	M1 A1		Using their value for sum Both correct
7		Line is $y = 4 - x$ Root is 1.5 - 1.6	M1 A1,A1 A1	4	Correct intercept and correct gradient Follow through

8	(a)(i)	150 cm	B1	4	Accept reasonable alternative answers
	(ii)	163 cm	B1		
	(b)	1. Median only slightly greater 2. Range greater	B1 B1		
9	(a)	$x = \frac{8 \pm \sqrt{64+16}}{2} = \frac{8 \pm \sqrt{80}}{2}$ $= \frac{8 \pm \sqrt{16 \times 5}}{2} = \frac{8 \pm 4\sqrt{5}}{2}$ $= 4 \pm 2\sqrt{5}$	M1 A1 A1	6	Formula $\sqrt{80}$ seen
	(b)	$x^2 + 2px + p^2 = x^2 - 6x + q$ $\Rightarrow 2p = -6 \Rightarrow p = -3$ $\Rightarrow q = p^2 = 9$	M1 A1 A1		Expand lhs For p For q

Section A Total 36

Assessment Objectives Grid

Question	AO2	AO3	AO4	Total
1	2	0	0	2
2	0	4	0	4
3	0	4	0	4
4	2	0	0	2
5	3	0	0	3
6	8	0	0	8
7	3	0	0	3
8	0	0	4	4
9	6	0	0	6
Totals	24	8	4	36