

CANDIDATE NAME

CENTRE

MINIBED

UNIVERSITY OF CAMBRIDGE INTERNATIONAL EXAMINATIONS International General Certificate of Secondary Education

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Paper 2 (Extended)

MATHEMATICS

October/November 2011

1 hour 30 minutes

0581/22

Candidates answer on the Question Paper.

Additional Materials:

Electronic calculator

Mathematical tables (optional)

Geometrical instruments Tracing paper (optional)

CANDIDATE

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READ THESE INSTRUCTIONS FIRST

Write your Centre number, candidate number and name on all the work you hand in.

Write in dark blue or black pen.

You may use a pencil for any diagrams or graphs.

Do not use staples, paper clips, highlighters, glue or correction fluid.

DO **NOT** WRITE IN ANY BARCODES.

Answer all questions.

If working is needed for any question it must be shown below that question.

Electronic calculators should be used.

If the degree of accuracy is not specified in the question, and if the answer is not exact, give the answer to three significant figures. Give answers in degrees to one decimal place.

For π , use either your calculator value or 3.142.

At the end of the examination, fasten all your work securely together.

The number of marks is given in brackets [] at the end of each question or part question.

The total of the marks for this paper is 70.

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		30

1 A bus leaves a port every 15 minutes, starting at 09 00. The last bus leaves at 17 30.

How many times does a bus leave the port during one day?

		Answer		[2]
2	Factorise completely $ax + bx + ay + by$.			
		Answer		[2]
3	Use your calculator to find the value of (a) $3^0 \times 2.5^2$,			
	(b) 2.5^{-2} .	Answer(a)		[1]
		Answer(b)		[1]
4	The cost of making a chair is \$28 correct to the near	rest dollar.		
	Calculate the lower and upper bounds for the cost of	of making 450 chair	S.	

Answer lower bound \$

upper bound \$

[2]

5 Jiwan incorrectly wrote $1 + \frac{1}{2} + \frac{1}{3} + \frac{1}{4} = 1\frac{3}{9}$.

Show the correct working and write down the answer as a mixed number.

 [3]

6 The force, F, between two magnets varies **inversely** as the **square** of the distance, d, between them.

F = 150 when d = 2.

Calculate F when d = 4.

$$Answer F =$$
 [3]

$$7 \qquad \begin{pmatrix} 0 & 2 \\ -3 & 4 \end{pmatrix} \begin{pmatrix} a \\ b \end{pmatrix} = \begin{pmatrix} 8 \\ 25 \end{pmatrix}$$

Find the value of *a* and the value of *b*.

Answer
$$a =$$

$$b =$$
[3]

8 A cruise ship travels at 22 knots.

[1 knot is 1.852 kilometres per hour.]

Convert this speed into metres per second.

Answer m/s [3]

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- 9 A sequence is given by $u_1 = \sqrt{1}$, $u_2 = \sqrt{3}$, $u_3 = \sqrt{5}$, $u_4 = \sqrt{7}$, ...
 - (a) Find a formula for u_n , the *n*th term.

$$Answer(a) u_n =$$
 [2]

(b) Find u_{29} .

$$Answer(b) u_{29} =$$
 [1]

10 Write as a single fraction in its simplest form.

$$\frac{3}{x+10} - \frac{1}{x+4}$$

Answer [3]

11 Find the values of m and n.

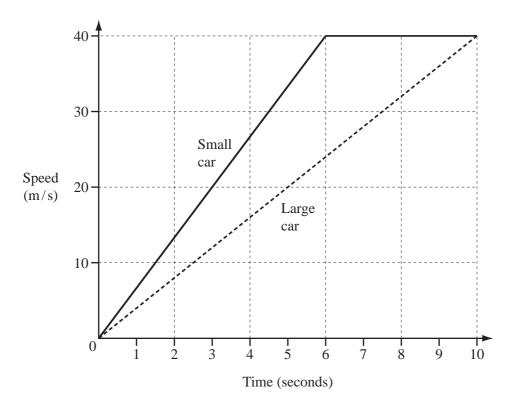
(a)
$$2^m = 0.125$$

Answer(a)
$$m =$$
 [2]

(b)
$$2^{4n} \times 2^{2n} = 512$$

$$Answer(b) n =$$
 [2]

12

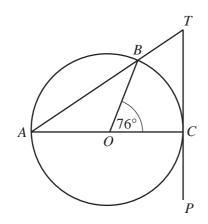


A small car accelerates from 0 m/s to 40 m/s in 6 seconds and then travels at this constant speed. A large car accelerates from 0 m/s to 40 m/s in 10 seconds.

Calculate how much further the small car travels in the first 10 seconds.

..... m [4] Answer

13



North

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AOC is a diameter of the circle, centre O. AT is a straight line that cuts the circle at B. PT is the tangent to the circle at C. Angle $COB = 76^{\circ}$.

(a) Calculate angle ATC.

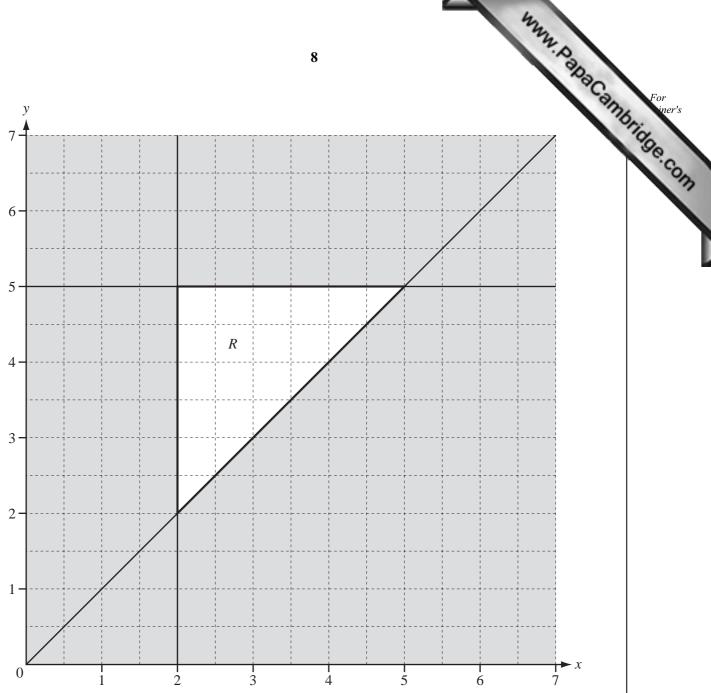
$$Answer(a) \text{ Angle } ATC =$$
 [2]

(b) T is due north of C.

Calculate the bearing of B from C.

Answer(b) [2]



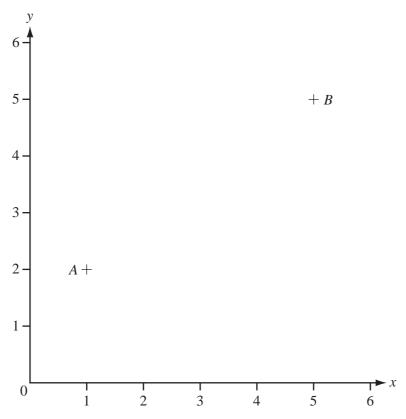


The region R is bounded by three lines.

Write down the three inequalities which define the region R.

Answer	
	 [4]





The points A(1, 2) and B(5, 5) are shown on the diagram.

(a) Work out the co-ordinates of the midpoint of AB.

Answer(a) (______ , _____) [1]

(b) Write down the column vector \overrightarrow{AB} .

$$Answer(b) \overrightarrow{AB} = \left(\begin{array}{c} \\ \\ \end{array} \right)$$
 [1]

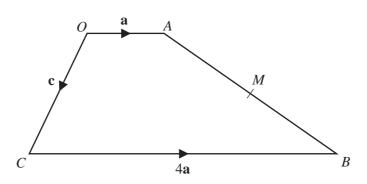
(c) Using a straight edge and compasses only, draw the locus of points which are equidistant from A and from B.

Petrol	Diesel	Liquid Hydrogen	Electricity
40	12	2	6

			10	MM. P.	For iner's
In a	survey of 60 cars, the typ	e of fuel that they u	se is recorded in the ta	able below.	For
Eacl	n car only uses one type o	f fuel.		`	iner's
	Petrol	Diesel	Liquid Hydrogen	Electricity	Se. COM
	40	12	2	6	
(a)	Write down the mode.				
			Answer(a)		[1]
(b)	Olav drew a pie chart to	illustrate these figur	res.		
	Calculate the angle of the	e sector for Diesel.			
			Answer(b)		[2]
(-)	C-11-4-41-174	41-414	1	·	
(c)	Calculate the probability Write your ensure as a fi			ity.	
	Write your answer as a fi	action in its simple	St 101111.		

Answer(c)	 [2]

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O is the origin, $\overrightarrow{OA} = \mathbf{a}$, $\overrightarrow{OC} = \mathbf{c}$ and $\overrightarrow{CB} = 4\mathbf{a}$. M is the midpoint of AB.

- (a) Find, in terms of a and c, in their simplest form
 - (i) the vector \overrightarrow{AB} ,

$$Answer(a)(i) \overrightarrow{AB} =$$
 [2]

(ii) the position vector of M.

Answer(a)(ii) [2]

(b) Mark the point *D* on the diagram where $\overrightarrow{OD} = 3\mathbf{a} + \mathbf{c}$.

[2]

18

$$w = \frac{1}{\sqrt{LC}}$$

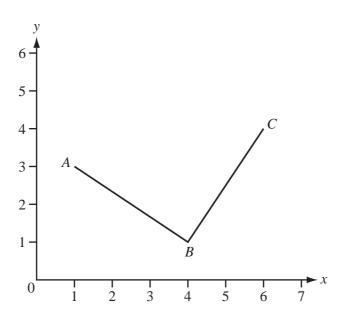
(a) Find w when $L = 8 \times 10^{-3}$ and $C = 2 \times 10^{-9}$. Give your answer in standard form.

$$Answer(a) w =$$
 [3]

(b) Rearrange the formula to make *C* the subject.

$$Answer(b) C =$$
 [3]

19



A(1,3), B(4,1) and C(6,4) are shown on the diagram.

- (a) Using a straight edge and compasses only, construct the angle bisector of angle ABC. [2]
- **(b)** Work out the equation of the line *BC*.

Answer(b) [3]

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(c) ABC forms a **right-angled isosceles** triangle of area 6.5 cm².

Calculate the length of AB.

Answer(c) AB = cm [2]

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