

UNIVERSITY OF CAMBRIDGE INTERNATIONAL EXAMINATIONS International General Certificate of Secondary Education

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CANDIDATE NAME						
CENTRE NUMBER				CANDIDATE NUMBER		

MATHEMATICS 0580/32

Paper 3 (Core) May/June 2010

2 hours

Candidates answer on the Question Paper.

Additional Materials: Electronic calculator

Mathematical tables (optional)

Geometrical instruments Tracing paper (optional)

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 104.

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1	(a)	(i)	- 1	2 and	36 are	factors	of 36

		Write down all the other factors of 36.	
		Answer(a)(i)	[2]
	(ii)	1 and 2 are common factors of 36 and 90.	
		Write down two more common factors of 36 and 90.	
		$Amg_{ij}(a)(ii)$	[2]
		Answer(a)(ii)	[2]
(b)	Wri	te down all the square numbers between 20 and 50.	
		Answer(b)	[3]
(c)	p ar	and q are prime numbers.	
		$p^3 \times q = 56$	
	Fine	d p and q .	

Answer(c) p =

[2]

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2	Francis earns \$150 per week.
	He has \$132 left after he pays his tax.

(:	a)	Calculate what	percentage	of his	\$150	he par	vs in	tax.
1	a j	Calculate What	percentage	OI IIIS	$\varphi_1 \supset 0$	ne pa	y 5 111	ι

	Answer(a) %	[3]
(b)	He divides the \$132 between expenses, savings and family in the ratio	
	Expenses: Savings: Family = 15:7:11.	
(Calculate his expenses.	
	Answer(b) \$	[3]
(c)	His rent is \$24 per week.	
	What fraction of the \$132 is this? Give your answer as a fraction in its simplest form.	
	Answer(c)	[2]
(d)	His earnings of \$150 per week increase by 8%.	
	Calculate his new earnings.	

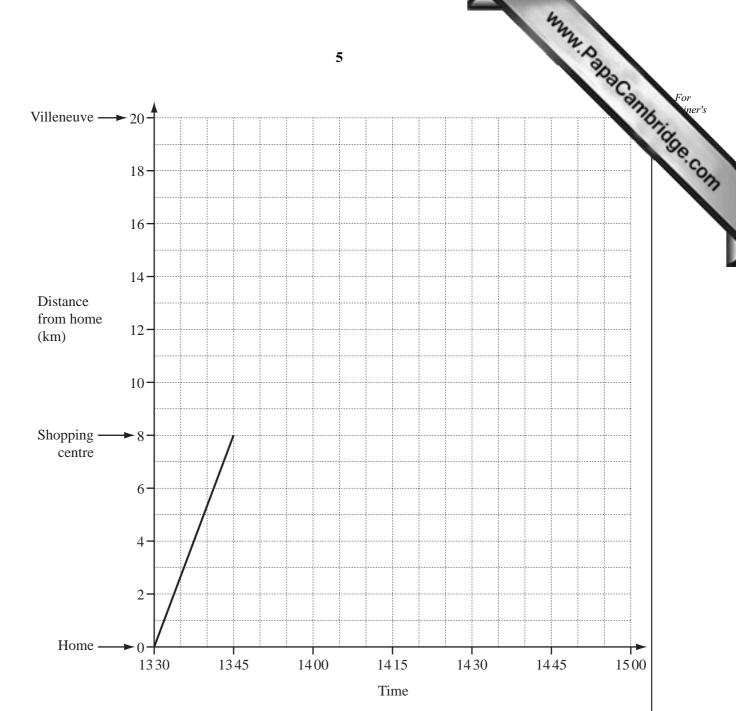
Answer(d) \$

[2]

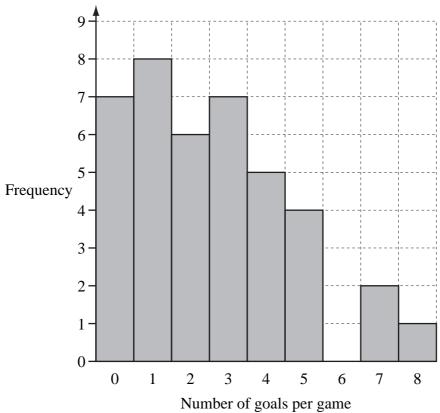
HAMAN A BANAC CAMP For iner's

- 3 Mrs Sesay leaves home by car at 1330. After 15 minutes she stops at a shopping centre, 8 kilometres from home.
 - (a) Calculate the average speed for her journey. Give your answer in kilometres per hour.

		Answer(a)	km/h	[2]
(b)		leaves the shopping centre half an hour later. travels a further 12 kilometres at the speed of 36 km/h to Villeneuve.		
	(i)	Write down the time when she leaves the shopping centre.		
		Answer(b)(i)		[1]
	(ii)	Calculate the time, in minutes, that she takes to travel from the shopping Villeneuve.	; centre	e to
		Answer(b)(ii)	min	[2]
	(iii)	On the grid opposite, complete the travel graph showing her journey.		[2]
(c)		son, Braima, also leaves home at 13 30 and cycles the 20 kilometres to Villeneuveycles at a speed of 15 km/h.	€.	
	(i)	Calculate how long his journey takes. Give your answer in hours and minutes.		
		<i>Answer(c)</i> (i) h	min	[2]
	(ii)	Show his journey on the grid.		[1]
	(iii)	How many minutes after his mother does Braima arrive at Villeneuve?		
		Answer(c)(iii)	min	[1]







Karen keeps a record of how many goals United score in each of 40 games. She draws a bar chart to show this information.

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(a) Use the information in the bar chart to complete the frequency table below.

Number of goals per game	0	1	2	3	4	5	6	7	8
Frequency							0	2	1
Frequency × Number of goals							0	14	8

(\mathbf{h})	(i)	Hayy many go	പിപ	did Uni	itad caara	in tha	10 gamas?

Answer(b)(i) [1]

(ii) Calculate the mean number of goals scored per game.

Answer(b)(ii) [2]

[2]

(;;;)	Find	tha	median.
(1111)	Fina	tne	median.

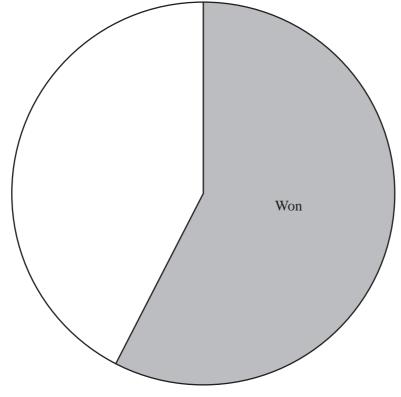
Answer(b)(iii)	[2]

(iv) Write down the mode.

- (c) United won 23 games and lost 12 games. The other games ended in a draw.
 - (i) How many games ended in a draw?



(ii) Complete the pie chart accurately to represent these results. Label the sectors.



[2]

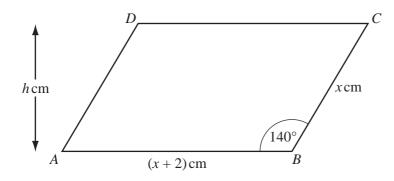
- (d) If one game from the 40 is chosen at random, use the information in **part** (c) to find the probability that United
 - (i) won,

Answer(d)(i) ______[1]

(ii) did not draw.

Answer(d)(ii) [1]

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NOT TO SCALE

In the parallelogram ABCD, AB = (x + 2) cm, BC = x cm and angle $ABC = 140^{\circ}$.

- (a) When x = 10,
 - (i) use trigonometry to calculate the height, h cm, of the parallelogram,

$$Answer(a)(i) h = [2]$$

(ii) calculate the area of the parallelogram.

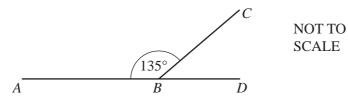
(b) For a different value of x, the perimeter of the parallelogram is 38 cm.

Write down an equation in x and solve it.

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

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6 (a)



In the diagram, ABD is a straight line and angle $ABC = 135^{\circ}$.

(i) Find the size of angle *CBD*.

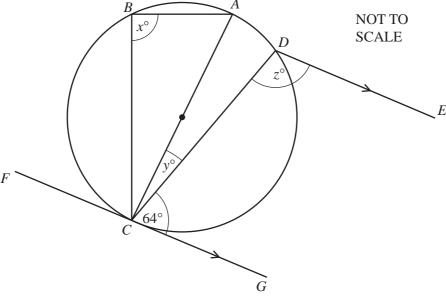
$$Answer(a)(i) Angle CBD =$$
 [1]

(ii) A regular polygon has interior angles of 135°. Find the number of sides of the polygon.

(iii) Write down the name of the polygon in part (a)(ii).

Answer(a)(iii) [1]

(b)



A, B, C, and D lie on a circle. AC is a diameter. FCG is a tangent to the circle at C. DE is parallel to CG. Find the values of x, y and z.

Answer(b) x =	
<i>y</i> =	
z =	

[5]

For iner's

An area of land *ABCDEF* is in the shape of a hexagon.

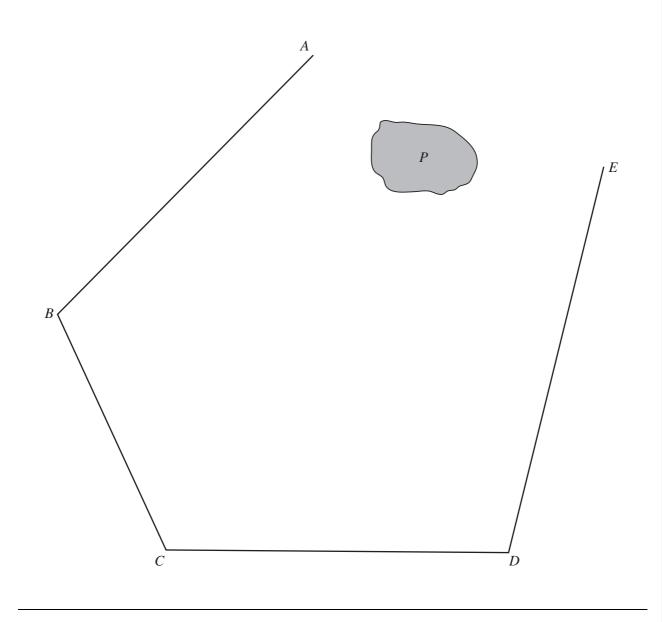
Part of a scale drawing of the land is shown on the opposite page.

A pond, *P*, is inside the hexagon.

On the plan, 1 centimetre represents 20 metres.

Parts (a), (b), (c) and (f) must be completed using a ruler and compasses only. All construction arcs must be clearly shown.

	•	
(a)	On the land, $AF = 80$ m and $EF = 100$ m.	
	On the scale drawing, find the point F , by construction. Draw the lines AF and EF .	[2]
(b)	On the scale drawing, construct the perpendicular bisector of CD . Label the point M where the bisector crosses CD .	[2]
(c)	On the scale drawing, construct the bisector of angle <i>BCD</i> .	[2]
(d)	The bisectors from part (b) and part (c) meet at L .	
	(i) Measure and write down the length of LM in centimetres.	
	Answer(d)(i) cm	[1]
	(ii) Find the distance between L and M on the land. Give your answer in metres.	
	<i>Answer(d)</i> (ii) m	[1]
(e)	Triangle <i>CML</i> is a field for sheep.	
	Calculate the area of this field.	
	Answer(e) m ²	[2]
(f)	There is also a field for cows inside the hexagon. This field is the region nearer to D than to C and less than 120 m from D .	
	By constructing a suitable locus on the scale drawing, find and label this region R .	[2]

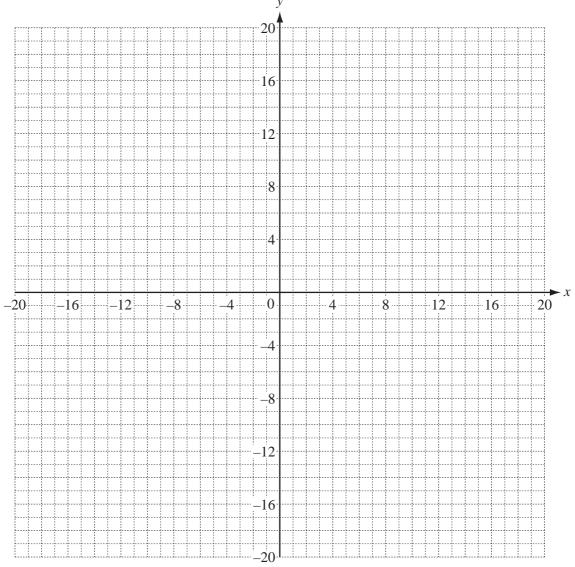


(a) Complete the table for the function $y = \frac{18}{x}$, $(x \neq 0)$.

Complete the table for the function $y = \frac{18}{x}$, $(x \neq 0)$.										4	M. P.	DaCan	For iner's		
	х	-18	-9	-6	-3	-2	-1	1	2	3	6	9	18		COM
	у				-6	-9	-18	18	9	6					

[3]

(b) On the grid below, draw the graph of $y = \frac{18}{x}$ for $-18 \le x \le -1$ and $1 \le x \le 18$.



[4]

(c) Write down the order of rotational symmetry of the graph.

Answer(c) [1]

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$=\frac{18}{x}$.		Tide Con
		13

- (d) (i) On the grid, draw the graph of y = x.
 - (ii) Write down the co-ordinates of the points of intersection of y = x and $y = \frac{18}{x}$.

- (e) On the grid, draw the reflection of y = x in the y-axis. [1]
- 9 (a) Simplify the following expressions.

(i)
$$5k + 3p - 2 + p - 2k - 5$$

$$Answer(a)(i)$$
 [2]

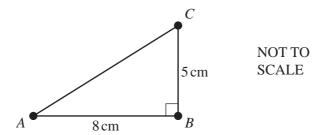
(ii)
$$5y^2 - 4x + 5x - 7y^2$$

- **(b)** Expand the following expressions.
 - (i) 3(4+7g)

(ii)
$$5m (5m^2 - t^2)$$

ABC. For iner's

10 Three bolts at A, B and C join the rods AB, BC and CA to form the right-angled triangle, ABC. Angle $ABC = 90^{\circ}$, AB = 8 cm and BC = 5 cm.



- (a) Calculate
 - (i) the length of the rod AC,

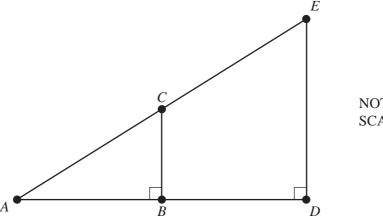
$$Answer(a)(i) AC =$$
 cm [2]

(ii) angle CAB.

$$Answer(a)(ii) Angle CAB = [2]$$

(b) Another right-angled triangle, *ADE*, is formed by adding rods to triangle *ABC*.

AC is extended to E and AB is extended to D, with more bolts at D and E. Rods AB and BD are the same length.



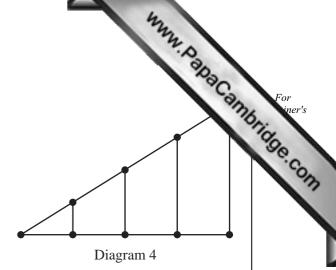
NOT TO SCALE

(i) Complete the following statement.

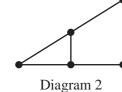
Triangle ADE is to triangle ABC. [1]

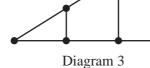
(ii) Describe clearly the **single** transformation which maps triangle ABC onto triangle ADE.

Answer(b)(ii) [3]









(c) The pattern of diagrams shown above is continued by adding more rods and bolts.Complete the table below.

Diagram	1	2	3	4	5
Number of bolts	3	5	7		

[2]

- (d) How many bolts are required for
 - (i) Diagram 10,

(ii) Diagram *n*?

(e) The number of bolts in Diagram n is 47.

Find the value of *n*.

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

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