

UNIVERSITY OF CAMBRIDGE INTERNATIONAL EXAMINATIONS International General Certificate of Secondary Education

CANDIDATE NAME					
CENTRE NUMBER			NDIDATE MBER		



0580/31 **MATHEMATICS**

Paper 3 (Core) May/June 2010

2 hours

Candidates answer on the Question Paper.

Additional Materials: Electronic calculator Geometrical instruments

Mathematical tables (optional) 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.

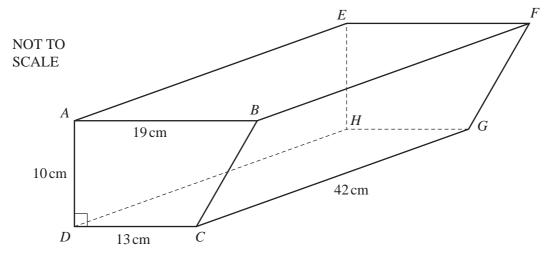
The number of marks is given in brackets [] at the end of each question or part question.

The total of the marks for this paper is 104.

The	e population of a village is 2250.	
(a)	32% of the population are children. Calculate the number of children in the village.	
	Answer(a)	[2]
(b)	360 people in the village are over the age of 60.	
	(i) For these 360 people, the ratio of men to women is 2:7. Calculate how many men are over the age of 60.	
	Answer(b)(i) [[2]
	(ii) Write 360 as a fraction of 2250 in its lowest terms.	
	4	·01
	<i>Answer(b)</i> (ii) [[2]
(c)	The population of 2250 is expected to increase by 18% next year. Calculate the expected population next year.	
	Answer(c) [[3]
(d)	Write the number 2250 in standard form.	
(u)		1]
(e)	Another village has a population of 1770, correct to the nearest ten. Write down the lower bound for the population of this village.	
	Answer(e)[[1]

© UCLES 2010 0580/31/M/J/10

For Examiner's Use



The diagram shows a block of stone in the shape of a prism of length 42 cm. The cross-section is a trapezium *ABCD*.

AB = 19 cm, AD = 10 cm, DC = 13 cm and angle $ADC = 90^{\circ}$.

- (a) Calculate
 - (i) the perimeter of the rectangular face ABFE,

Answer(a)(i) cm [2]

(ii) the area of the cross-section ABCD,

Answer(a)(ii) cm^2 [3]

(iii) the volume of the block of stone.

Answer(a)(iii) cm³ [2]

(b) The mass of 1 cubic centimetre of the stone is 4 grams. Calculate the mass of the block. Give your answer in kilograms.

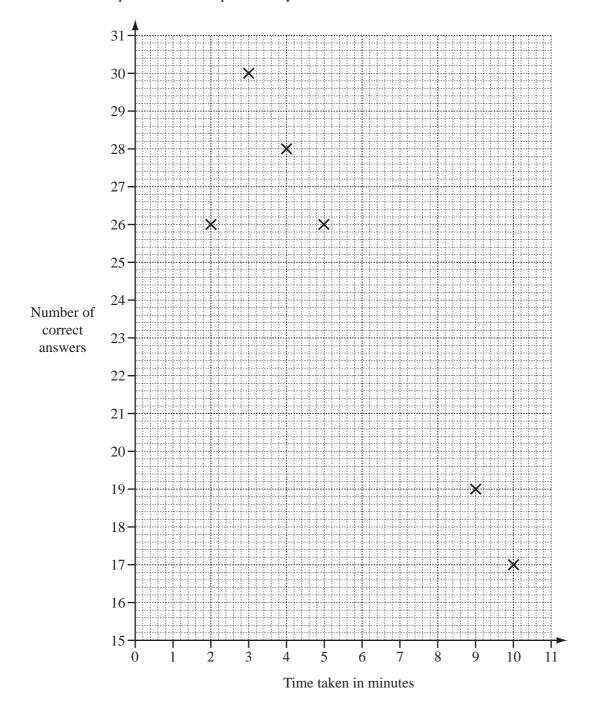
Answer(b) kg [3]

3 Twelve students each answer 30 questions in a quiz.

The time taken and the number of correct answers for each student is given in the table.

Time taken in minutes	9	4	5	10	3	2	8	8	4	5	6	7
Number of correct answers	19	28	26	17	30	26	25	20	23	21	24	22

(a) Complete the scatter diagram below to show this information. The first six points have been plotted for you.

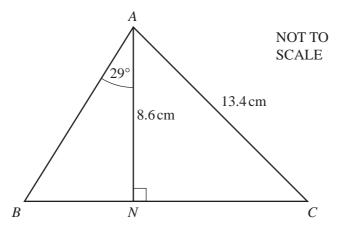


[3]

© UCLES 2010 0580/31/M/J/10

(b)	Wh	at type of correlation does the scatter diagram	show?			For Examiner's Use
			Answer(b)		[1]	
(c)	(i)	Find the range of the time taken .				
	(44)		Answer(c)(i)	min	[1]	
	(ii)	Calculate the mean time taken.				
			Answer(c)(ii)	min	[3]	
(d)	(i)	Find the mode for the number of correct an	swers.			
			Answer(d)(i)		[1]	
	(ii)	Find the median for the number of correct an	swers.			
	` '					
			Answer(d)(ii)		[1]	
(e)	One	e of the 12 students is selected at random.				
	Wri	te down the probability that the student				
	(i)	took more than 8 minutes to answer the quiz,	,			
			Answer(e)(i)		[1]	
	(ii)	took less than 5 minutes and had more than 2	24 correct answe	rs.		
			Answer(e)(ii)		[2]	

For Examiner's Use



In triangle ABC, AN = 8.6 cm and is perpendicular to BC.

Angle $BAN = 29^{\circ}$ and AC = 13.4 cm.

- (a) Use trigonometry to calculate
 - (i) the length of BN,

$$Answer(a)(i) BN = cm [3]$$

(ii) angle CAN.

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

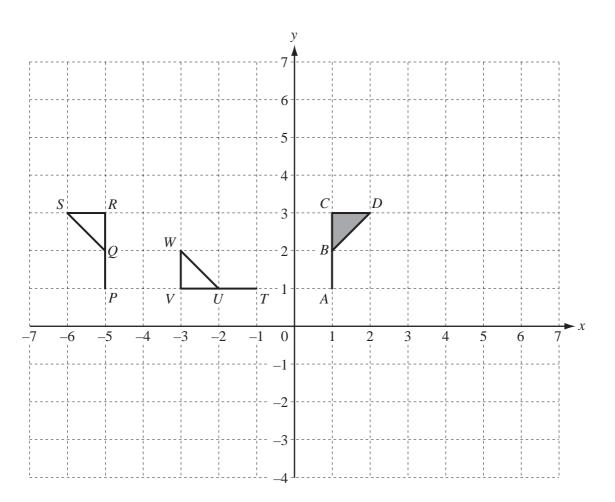
(b) Calculate the length of *NC*.

$$Answer(b) NC = \qquad cm [3]$$

0580/31/M/J/10

© UCLES 2010

For Examiner's Use

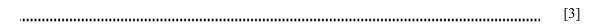


(a) On the grid, draw the image of

(i) the flag *ABCD* after translation by
$$\begin{pmatrix} 4 \\ -3 \end{pmatrix}$$
, [2]

- (ii) the flag *ABCD* after enlargement, scale factor 2, centre the origin, [2]
- (iii) the flag ABCD after reflection in the x-axis. [2]
- **(b)** Describe fully the **single** transformation which maps *ABCD* onto *PQRS*.

(c) Describe fully the **single** transformation which maps *ABCD* onto *TUVW*.



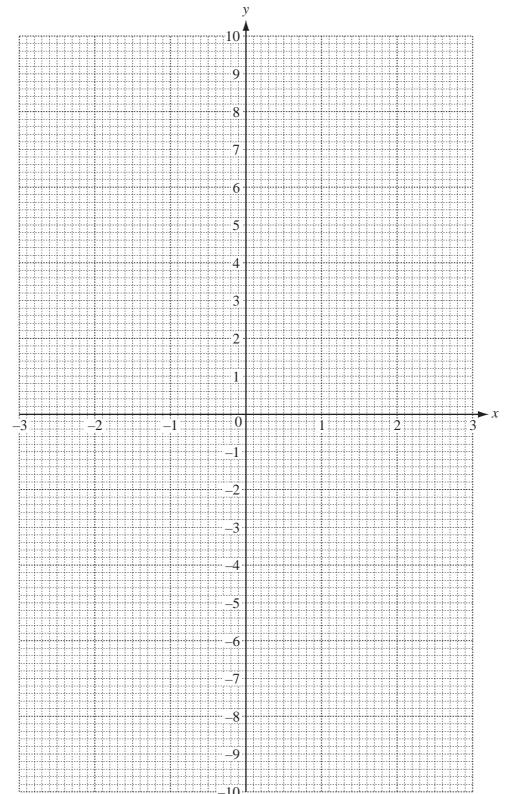
6 (a) Complete the table of values for the function $y = \frac{3}{x}$, $x \neq 0$.

For Examiner's Use

х	-3	-2.5	-2	-1.5	-1	-0.5	-0.3	0.3	0.5	1	1.5	2	2.5	3
y	-1	-1.2		-2	-3	-6				3	2	1.5		1

[3]

(**b**) On the grid below, draw the graph of $y = \frac{3}{x}$ for $-3 \le x \le -0.3$ and $0.3 \le x \le 3$.



[5]

(c)	Use your graph to solve the equation	<u>3</u>	= 7.
		χ	

For Examiner's Use

$$4nswer(c) x =$$
 [1]

(d) Complete the table of values for $y = \frac{2x}{3} - 1$.

х	-3	0	3
у			

[2]

(e) On the grid, draw the straight line
$$y = \frac{2x}{3} - 1$$
 for $-3 \le x \le 3$. [2]

(f) Write down the co-ordinates of the points where the line $y = \frac{2x}{3} - 1$ intersects the graph of $y = \frac{3}{x}$.

S = a + 4d

(a) Find S when a = 17 and d = -5.

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

(b) Find d when S = 37 and a = 5.

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

(c) Make d the subject of the formula S = a + 4d.

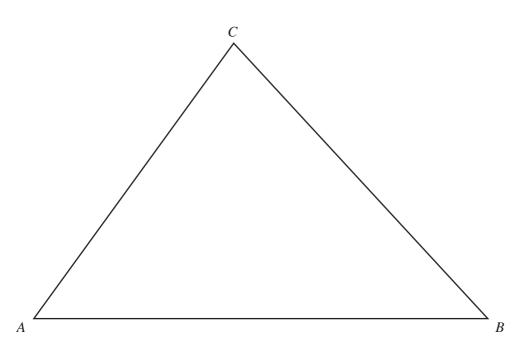
$$Answer(c) d =$$
 [2]

For
Examiner
Hee

In t	his question give all your answers to 2 decimal places.	
(a)	Ankuri lends her brother \$275 for 4 years at a rate of 3.6% per year simple interest. Calculate the total amount her brother owes after 4 years.	
(b)	Answer(a) \$ Monesh invests \$650 in a bank which pays 4% per year compound interest.	[3]
	Calculate the amount Monesh will have after 2 years.	
	Answer(b) \$	[3]
(c)	 Theresa and Ian have 400 euros (€) each. (i) Theresa changes her €400 for pounds (£) when the exchange rate is €1= £ 0.7857. Calculate the amount she receives. 	
	 Answer(c)(i) £ (ii) Ian changes his €400 for dollars (\$) when the exchange rate is \$1= € 0.6374. Calculate the amount he receives. 	[2]
	Answer(c)(ii) \$	[3]

© UCLES 2010 0580/31/M/J/10

For Examiner's Use



Triangle ABC is drawn accurately.

- (a) Measure and write down
 - (i) the length of AC,

$$Answer(a)(i) AC =$$
 cm [1]

(ii) the size of angle CAB.

$$Answer(a)$$
(ii) Angle $CAB =$ [1]

(b) Construct accurately the locus of all the points 7 cm from C.

- [2]
- (c) The point *X* lies **outside** the triangle *ABC*, with CX = 7 cm and angle $BCX = 67^{\circ}$. Draw accurately the line CX.

[2]

(d) Draw the line BX. Measure and write down the length of this line.

$$Answer(d) BX = \qquad cm \qquad [1]$$

(e) Using a straight edge and compasses only, construct the locus of points equidistant from BC and from BX.

[2]

Question 10 is printed on the next page.

Diagram 3

Diagram 2

For Examiner's Use

Look at the sequence of diagrams.

(-)	D:	2	1	_	1 : . 1.4	-£2
(a)	Diagram	2	nas	a	neignt	or 2 .

Write down the height of

(i)	Diagram	5
(1) Diagram	J.

Diagram 1

 $Answer(a)(i) \qquad [1]$

(ii) Diagram 10,

Answer(a)(ii) [1]

Diagram 4

(iii) Diagram n.

Answer(a)(iii) [1]

(b) Diagram 2 has a width of 3.

Find the width of

(i) Diagram 5,

Answer(b)(i) [1]

(ii) Diagram 10,

Answer(b)(ii) [1]

(iii) Diagram n.

Answer(b)(iii) [2]

- (c) There are 6 squares in Diagram 2 and 15 squares in Diagram 3.
 - (i) Write down how many squares there are in Diagram 5.

 $Answer(c)(i) \qquad [1]$

(ii) Explain how this is found from the height and width of the diagram.

Answer(c)(ii) [1]

(iii) Write down, in terms of n, how many squares there are in Diagram n.

Answer(c)(iii) [1]

Permission to reproduce items where third-party owned material protected by copyright is included has been sought and cleared where possible. Every reasonable effort has been made by the publisher (UCLES) to trace copyright holders, but if any items requiring clearance have unwittingly been included, the publisher will be pleased to make amends at the earliest possible opportunity.

University of Cambridge International Examinations is part of the Cambridge Assessment Group. Cambridge Assessment is the brand name of University of Cambridge Local Examinations Syndicate (UCLES), which is itself a department of the University of Cambridge.