

## UNIVERSITY OF CAMBRIDGE INTERNATIONAL EXAMINATIONS International General Certificate of Secondary Education

CANDIDATE NAME			
CENTRE NUMBER		CANDIDATE NUMBER	
MATHEMATICS			0581/22
Paper 2 (Extended)			May/June 2013
			1 hour 30 minutes
Candidates answer or	the Question Paper.		
Additional Materials:	Electronic calculator Tracing paper (optional)	Geometrical instrument	S

## **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  $\pi$ , use either your calculator value or 3.142.

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

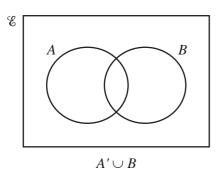
The number of marks is given in brackets [ ] at the end of each question or part question.

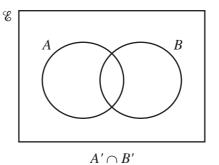
The total of the marks for this paper is 70.

This document consists of 12 printed pages.



1 Shade the required region on each Venn diagram.





[2]

**2** Factorise completely.

$$kp + 3k + mp + 3m$$

Answer	 [2]

3 The first five terms of a sequence are shown below.

13 9 5 1 -3

Find the *n*th term of this sequence.

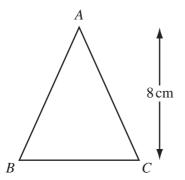
*Answer* ...... [2]

4	Calculate	$(4.3 \times 10^8)$	$+(2.5\times10^7)$	
	Cuicuiuic	(1.5 / 10	)   ( <u>2.5</u> / 10 )	•

Give your answer in standard form.

<i>Answer</i> [2	Answer		[2]
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5



NOT TO SCALE

Triangle ABC has a height of 8 cm and an area of 42 cm<sup>2</sup>.

Calculate the length of *BC*.

Answer 
$$BC = \dots$$
 cm [2]

	4
6	George and his friend Jane buy copies of the same book on the internet. George pays \$16.95 and Jane pays £11.99 on a day when the exchange rate is $$1 = £0.626$ .
	Calculate, in dollars, how much more Jane pays.
	Answer \$ [2]
7	(a) Use your calculator to work out $\sqrt{65} - 1.7^2$ .
	Write down all the numbers displayed on your calculator.
	Answer(a)[1]
	(b) Write your answer to part (a) correct to 2 significant figures.
	Answer(b)[1]
8	Joe measures the side of a square correct to 1 decimal place.  He calculates the <b>upper</b> bound for the area of the square as 37.8225 cm <sup>2</sup> .
	Work out Joe's measurement for the side of the square.
	work out foe's measurement for the side of the square.
	4
	Answer cm [2]

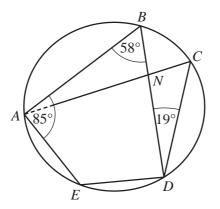
For
Examiner's
Use

9 A car, 4.4 metres long, has a fuel tank which holds 65 litres of fuel when full. The fuel tank of a mathematically similar model of the car holds 0.05 litres of fuel when full.

Calculate the length of the model car in centimetres.

4		r 🔿 T	
Answer	 cm	131	

**10** 



NOT TO SCALE

A, B, C, D and E are points on a circle. Angle  $ABD = 58^{\circ}$ , angle  $BAE = 85^{\circ}$  and angle  $BDC = 19^{\circ}$ . BD and CA intersect at N.

Calculate

(a) angle BDE,

$$Answer(a)$$
 Angle  $BDE = \dots [1]$ 

**(b)** angle *AND*.

$$Answer(b)$$
 Angle  $AND = \dots$  [2]

Without using a calculator, work out $\frac{6}{7} \div 1\frac{2}{3}$ .	
Write down all the steps in your working.	
	Answer[3]
Solve the equation. $5(2y - 17) = 60$	
Ar	$aswer y = \dots [3]$
Carol invests \$6250 at a rate of 2% per year compound in	nterest.
Calculate the <b>total</b> amount Carol has after 3 years.	
	4
	Answer \$[3]
	Answer \$[5]
	Write down all the steps in your working.  Solve the equation. $5(2y-17)=60$ An Carol invests \$6250 at a rate of 2% per year compound in Calculate the <b>total</b> amount Carol has after 3 years.

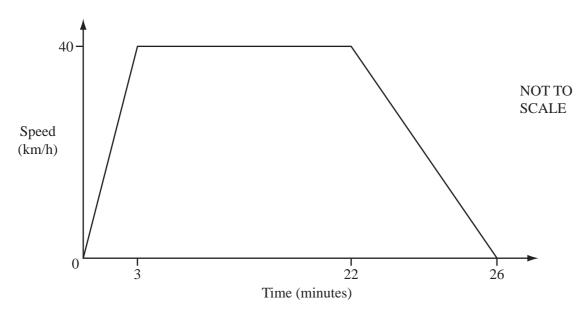
	7
14	y is inversely proportional to $x^3$ . y = 5 when $x = 2$ .
	Find y when $x = 4$ .
	$Answer y = \dots [3]$
15	Use the quadratic equation formula to solve
10	$2x^{2} + 7x - 3 = 0.$
	Show all your working and give your answers correct to 2 decimal places.

Answer x = ..... or x = ..... [4]

ForExaminer's Use

16

For Examiner's Use



The diagram shows the speed-time graph of a train journey between two stations.

The train accelerates for 3 minutes, travels at a constant maximum speed of 40 km/h, then takes 4 minutes to slow to a stop.

Calculate the distance in kilometres between the two stations.

Answer ...... km [4]

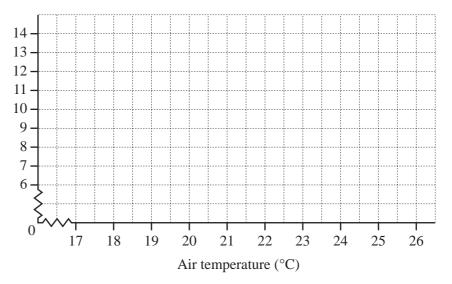
17 The owner of a small café records the average air temperature and the number of hot drinks he sells each day for a week.

For Examiner's Use

Air temperature (°C)	18	23	19	23	24	25	20
Number of hot drinks sold	12	8	13	10	9	7	12

(a) On the grid, draw a scatter diagram to show this information.

Number of hot drinks sold



[2]

(b) What type of correlation does your scatter diagram show?

(c) Draw a line of best fit on the grid.

[1]

18 Solve 6x + 3 < x < 3x + 9 for integer values of x.



Scale: 1 cm to 8 m

The rectangle ABCD is a scale drawing of a rectangular football pitch. The scale used is 1 centimetre to represent 8 metres.

- (a) Construct the locus of points 40 m from A and inside the rectangle. [2]
- (b) Using a straight edge and compasses only, construct the perpendicular bisector of *DB*. [2]
- (c) Shade the region on the football pitch which is more than  $40 \,\mathrm{m}$  from A and nearer to D than to B.

20 The heights, in metres, of 200 trees in a park are measured.

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Use

Height (h m)	$2 < h \le 6$	$6 < h \le 10$	$10 < h \le 13$	$13 < h \le 17$	$17 < h \le 19$	$19 < h \le 20$
Frequency	23	47	45	38	32	15

(a) Find the interval which contains the median height.

Answer(a)	[1]

(b) Calculate an estimate of the mean height.

(c) Complete the cumulative frequency table for the information given in the table above.

Height (h m)	$2 < h \le 6$	$h \le 10$	<i>h</i> ≤ 13	<i>h</i> ≤ 17	<i>h</i> ≤ 19	$h \le 20$
Cumulative frequency	23					

[2]

Question 21 is printed on the next page.

$$f(x) = 5x + 4$$

$$f(x) = 5x + 4$$
  $g(x) = \frac{1}{2x}, \quad x \neq 0$   $h(x) = \left(\frac{1}{2}\right)^x$ 

$$h(x) = \left(\frac{1}{2}\right)^x$$

Find

(a) fg(5),

Answer(a	 [2]
11111111111111	 121

(b) gg(x) in its simplest form,

(c)  $f^{-1}(x)$ ,

Answer(c) 
$$f^{-1}(x) = \dots [2]$$

(d) the value of x when h(x) = 8.

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