

CANDIDATE NAME

CENTRE

NUMBER

UNIVERSITY OF CAMBRIDGE INTERNATIONAL EXAMINATIONS International General Certificate of Secondary Education

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MATHEMATICS 0581/22

Paper 2 (Extended) May/June 2013

1 hour 30 minutes

CANDIDATE **NUMBER**

Candidates answer on the Question Paper.

Additional Materials: Electronic calculator 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.

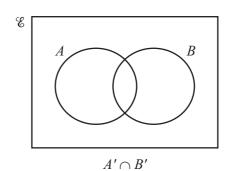
For π , use either your calculator value or 3.142.

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 70.

 $A' \cup B$



[2]

Factorise completely.

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

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

13

5

1

-3

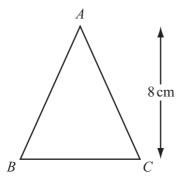
Find the *n*th term of this sequence.

4 Calculate $(4.3 \times 10^8) + (2.5 \times 10^7)$.

Give your answer in standard form.

Anguar		[2]

5



NOT TO SCALE

Triangle ABC has a height of 8 cm and an area of 42 cm².

Calculate the length of BC.

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

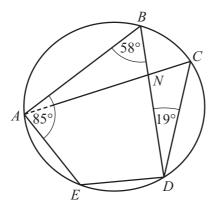
6	George and his friend Jane buy copies of the same book on the internet. George pays \$16.95 and Jane pays £11.99 on a day when the exchange rate is \$1 = £0.626.						
	George and his friend Jane buy copies of the same book on the internet. George pays \$16.95 and Jane pays £11.99 on a day when the 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)						
	Answer(b)[1]						
8	Joe measures the side of a square correct to 1 decimal place. He calculates the upper bound for the area of the square as 37.8225 cm ² .						
	Work out Joe's measurement for the side of the square.						
	Answer cm [2]						

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.

Answer		cm	[3]
--------	--	----	-----

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,

(b) angle *AND*.

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

Without using a calculator, work out $\frac{6}{7} \div 1\frac{2}{3}$. Write down all the steps in your working.

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	7%			
•	7	~		
•		9		L
	-	- 6		D

Answer	 [3]
	F - 1

12 Solve the equation.

$$5(2y - 17) = 60$$

Answer
$$y =$$
 [3]

13 Carol invests \$6250 at a rate of 2% per year compound interest.

Calculate the **total** 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.

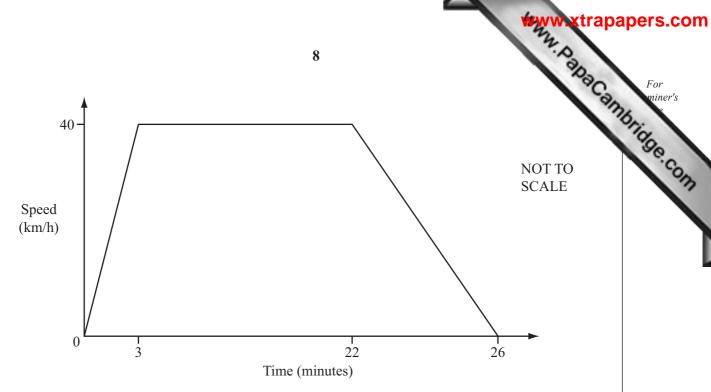
Answer
$$y = \dots$$
 [3]

For miner's

15 Use the quadratic equation formula to solve

$$2x^2 + 7x - 3 = 0.$$

Show all your working and give your answers correct to 2 decimal places.



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.

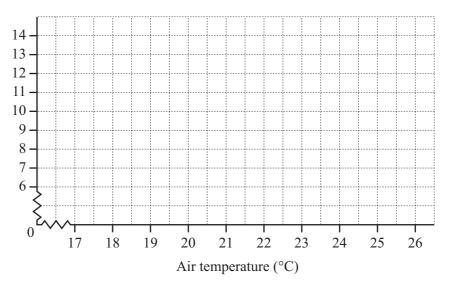
Answer km [4]

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

			9				10	www.xtrapapers.com
vner of a small café records ay for a week.	the aver	rage air	tempera	ature and	d the nu	mber of	•	No.
Air temperature (°C)	18	23	19	23	24	25	20	age
Number of hot drinks sold	12	8	13	10	9	7	12	COM

(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?

Answer(b) [1]

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

[1]

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 $40 \,\mathrm{m}$ 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. [1]

For miner's $9 < h \le 20$ 15

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

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.

Answer(b) m [4]

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

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

[2]

Question 21 is printed on the next page.

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

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

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

Find

(a)
$$fg(5)$$
,

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

Answer(b)
$$gg(x) =$$
 [2]

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

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

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

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

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