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 on the Question Paper.

Additional Materials: Electronic calculator
Tracing paper (optional)
Geometrical instruments

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.

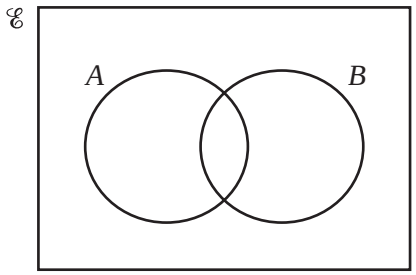
Answer **all** questions.
If working is needed for any question it must be shown below that question.
Electronic calculators should be used.
If the degree of accuracy is not specified in the question, and if the answer is not exact, give the answer to three significant figures. Give answers in degrees 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.

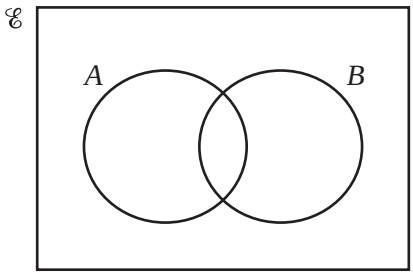
This document consists of **12** printed pages.

For Examiner's Use

1 Shade the required region on each Venn diagram.



$A' \cup B$



$A' \cap B'$

[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 nth term of this sequence.

Answer ..... [2]

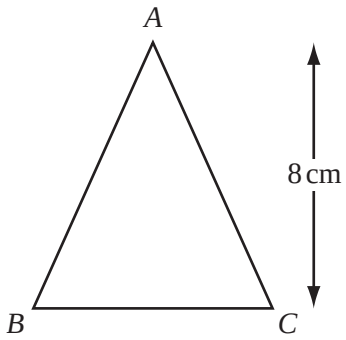
For Examiner's Use

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

Give your answer in standard form.

Answer ..... [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 = ... cm [2]

For Examiner's Use

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]

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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 **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]

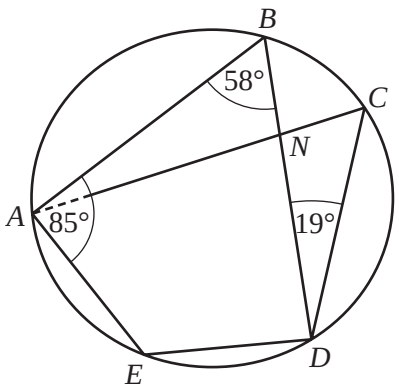
For Examiner's Use

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.

Answer ..... cm [3]

10



NOT TO SCALE

A, *B*, *C*, *D* and *E* are points on a circle.
Angle *ABD* = 58°, angle *BAE* = 85° and angle *BDC* = 19°.
BD and *CA* intersect at *N*.

Calculate

(a) angle *BDE*,

Answer(a) Angle *BDE* = ... [1]

(b) angle *AND*.

Answer(b) Angle *AND* = ... [2]

For Examiner's Use

11 Without using a calculator, work out $\frac{6}{7} \div 1\frac{2}{3}$.

Write down all the steps in your working.

Answer ..... [3]

---

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.

Answer \$ ..... [3]

For Examiner's Use

14 y is inversely proportional to x^3.
$y = 5$ when $x = 2$.

Find y when $x = 4$.

Answer $y =$ ..... [3]

---

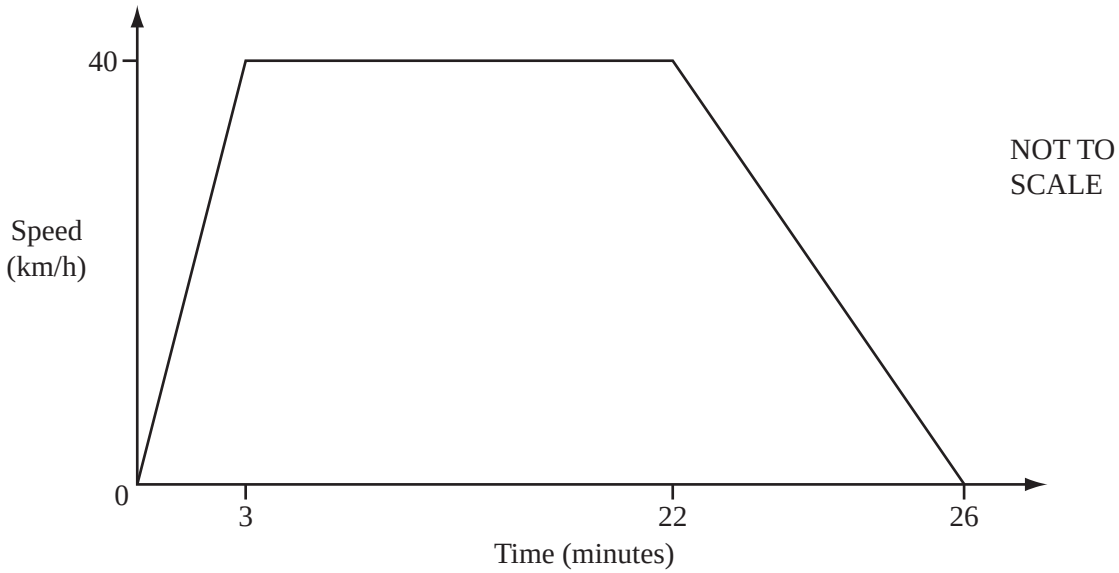
15 Use the quadratic equation formula to solve

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

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

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

16



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.

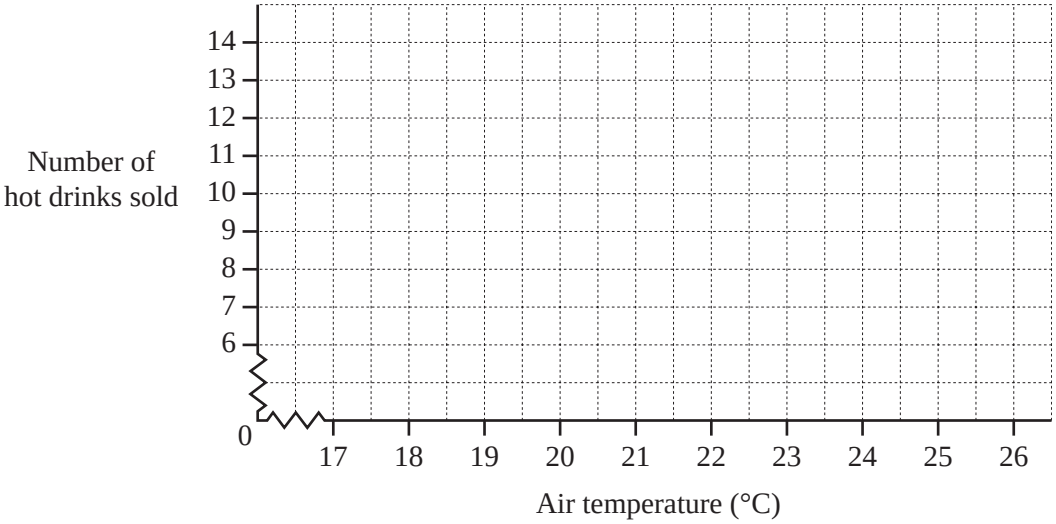
Calculate the distance in kilometres between the two stations.

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.

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.



[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]

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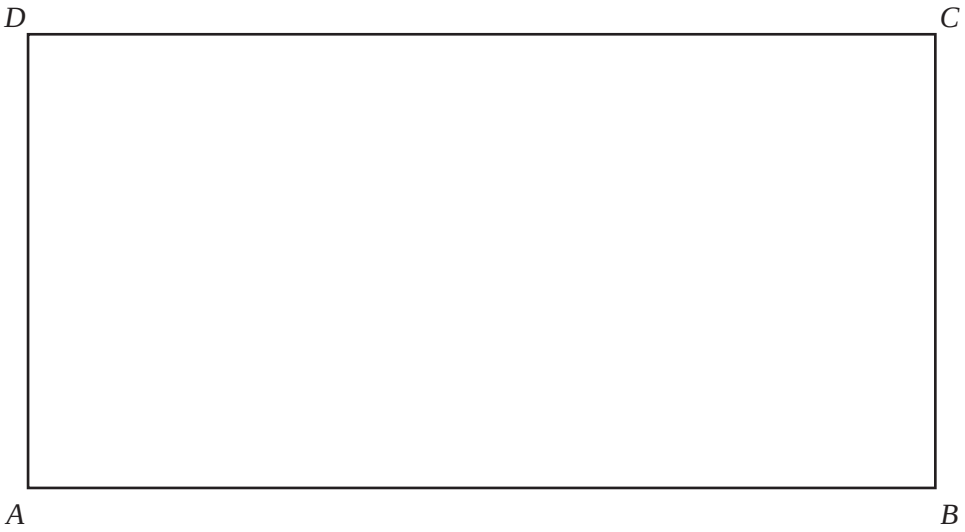
18 Solve $6x + 3 < x < 3x + 9$ for **integer** values of x.

Answer ..... [4]

19

For Examiner's Use



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 m from *A* **and** nearer to *D* than to *B*. [1]

For Examiner's Use

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

Height (h m)	$2 < h \leqslant 6$	$6 < h \leqslant 10$	$10 < h \leqslant 13$	$13 < h \leqslant 17$	$17 < h \leqslant 19$	$19 < h \leqslant 20$
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)	$2 < h \leqslant 6$	$h \leqslant 10$	$h \leqslant 13$	$h \leqslant 17$	$h \leqslant 19$	$h \leqslant 20$
Cumulative frequency	23					

[2]

Question 21 is printed on the next page.

For Examiner's Use

21 $f(x) = 5x + 4$ $g(x) = \frac{1}{2x}, \quad x \neq 0$ $h(x) = \left(\frac{1}{2}\right)^x$

Find

(a) fg(5) ,

Answer(a) ..... [2]

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

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

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

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

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

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