UNIVERSITY OF CAMBRIDGE INTERNATIONAL EXAMINATIONS
International General Certificate of Secondary Education

CANDIDATE NAME									
CENTRE NUMBER						CANDIDATE NUMBER			

* 3 6 2 4 8 6 9 7 6 9 *

MATHEMATICS **0580/22**

Paper 2 (Extended) **October/November 2012**

1 hour 30 minutes

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 70.

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

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1 Write the following numbers correct to one significant figure.

(a) 7682

Answer(a) ..... [1]

(b) 0.07682

Answer(b) ..... [1]

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2 Work out $11.3139 - 2.28 \times \sqrt[3]{9^2}$.

Give your answer correct to one decimal place.

Answer ..... [2]

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3 $$m = \frac{1}{4}[3h^2 + 8ah + 3a^2]$$

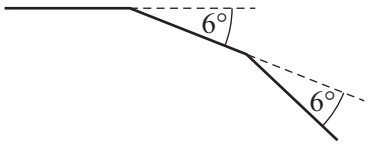
Calculate the exact value of m when $h = 20$ and $a = -5$.

Answer $m =$ ..... [2]

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4



NOT TO SCALE

The diagram shows two of the exterior angles of a regular polygon with n sides.
Calculate n.

Answer $n =$ ..... [2]

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5 The Tiger Sky Tower in Singapore has a viewing capsule which holds 72 people.
This number is 75% of the population of Singapore when it was founded in 1819.
What was the population of Singapore in 1819?

Answer ..... [2]

---

6 In a traffic survey of 125 cars the number of people in each car was recorded.

Number of people in each car	1	2	3	4	5
Frequency	50	40	10	20	5

Find

(a) the range,

Answer(a) ..... [1]

(b) the median,

Answer(b) ..... [1]

(c) the mode.

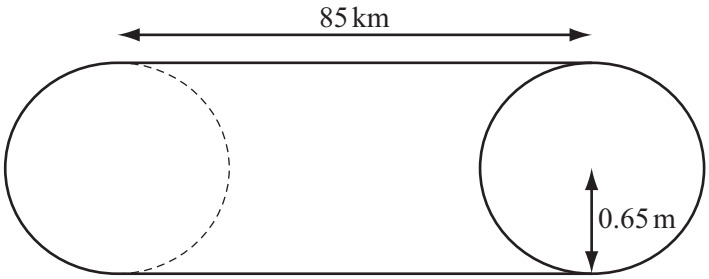
Answer(c) ..... [1]

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7 The number of spectators at the 2010 World Cup match between Argentina and Mexico was 82 000 correct to the nearest thousand.
If each spectator paid 2600 Rand (R) to attend the game, what is the lower bound for the total amount paid?
Write your answer in standard form.

Answer R ..... [3]

8



NOT TO SCALE

A water pipeline in Australia is a cylinder with **radius** 0.65 **metres** and length 85 **kilometres**.

Calculate the volume of water the pipeline contains when it is full.
Give your answer in cubic metres.

Answer ..... m^3 [3]

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9 A shop is open during the following hours.

	Monday to Friday	Saturday	Sunday
Opening time	0645	0730	0845
Closing time	1730	1730	1200

(a) Write the closing time on Saturday in the 12-hour clock time.

Answer(a) ..... [1]

(b) Calculate the total number of hours the shop is open in one week.

Answer(b) ..... h [2]

---

10 Solve the equation $4x - 12 = 2(11 - 3x)$.

Answer $x =$ ..... [3]

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11 List all the **prime numbers** which satisfy this inequality.

$$16 < 2x - 5 < 48$$

Answer ..... [3]

12



A company sells cereals in boxes which measure 10 cm by 25 cm by 35 cm.

They make a special edition box which is mathematically similar to the original box.

The volume of the special edition box is 15 120 cm^3.

Work out the dimensions of this box.

Answer ..... cm by ..... cm by ..... cm [3]

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13 The mass, m, of an object varies directly as the **cube** of its length, l.

$m = 250$ when $l = 5$.

Find m when $l = 7$.

Answer $m =$ ..... [3]

---

14 **(a)** $\left(\frac{3}{8}\right)^{\frac{3}{8}} \times \left(\frac{3}{8}\right)^{\frac{1}{8}} = p^q$

Find the value of p and the value of q.

Answer(a) $p =$ .....

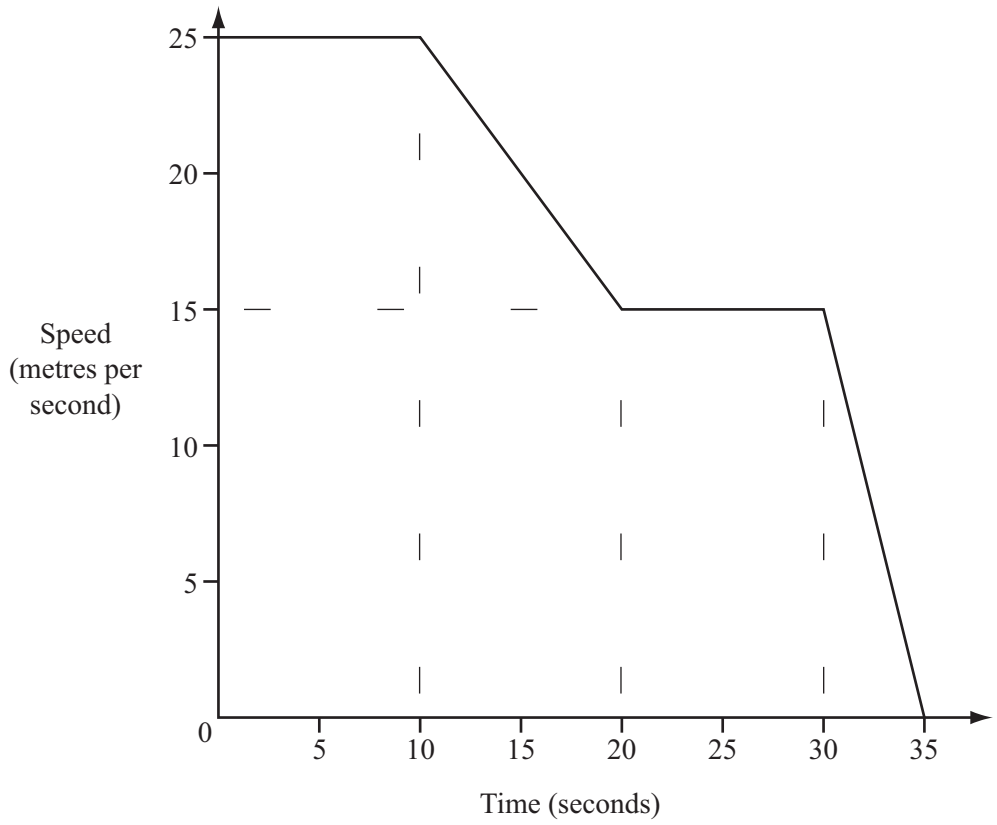
$q =$ ..... [2]

(b) $5^{-3} + 5^{-4} = k \times 5^{-4}$

Find the value of k.

Answer(b) $k =$ ..... [2]

15



The diagram shows the speed-time graph for the last 35 seconds of a car journey.

(a) Find the deceleration of the car as it came to a stop.

Answer(a) ..... m/s^2 [1]

(b) Calculate the total distance travelled by the car in the 35 seconds.

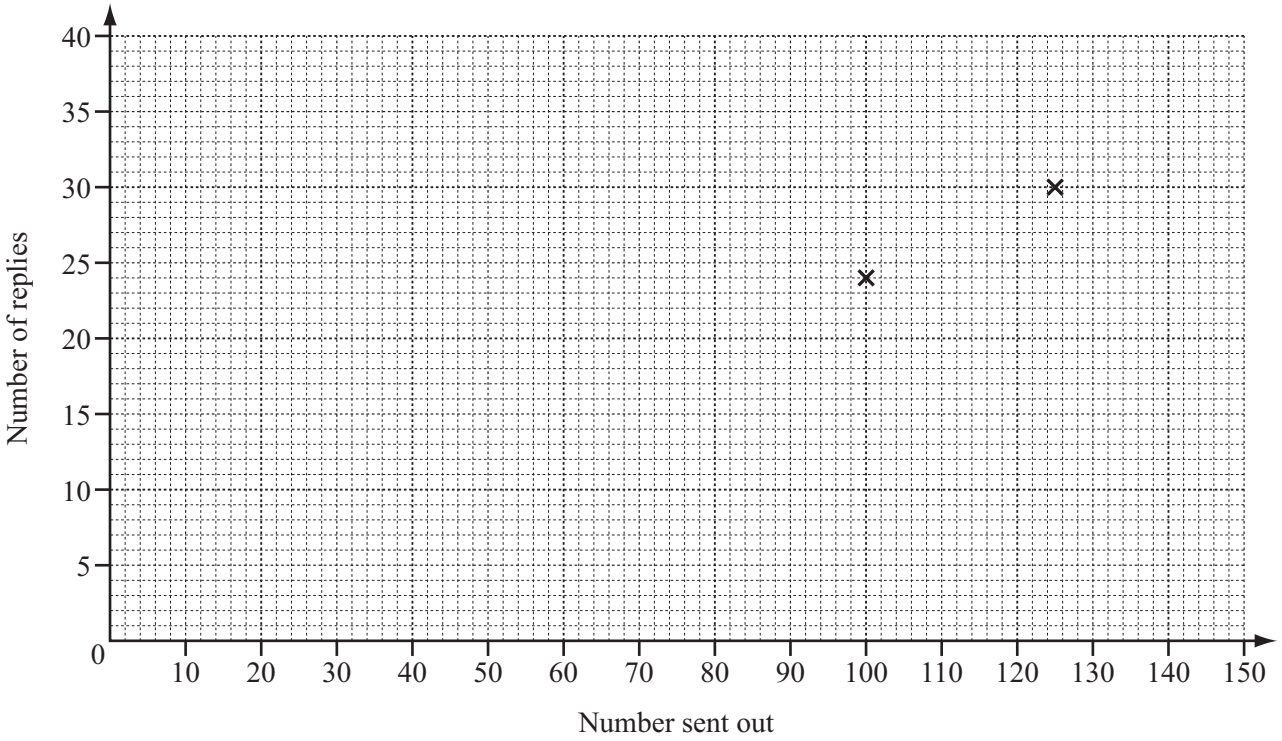
Answer(b) ..... m [3]

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16 A company sends out ten different questionnaires to its customers.
The table shows the number sent and replies received for each questionnaire.

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Questionnaire	A	B	C	D	E	F	G	H	I	J
Number sent out	100	125	150	140	70	105	100	90	120	130
Number of replies	24	30	35	34	15	25	22	21	30	31



(a) Complete the scatter diagram for these results.
The first two points have been plotted for you. [2]

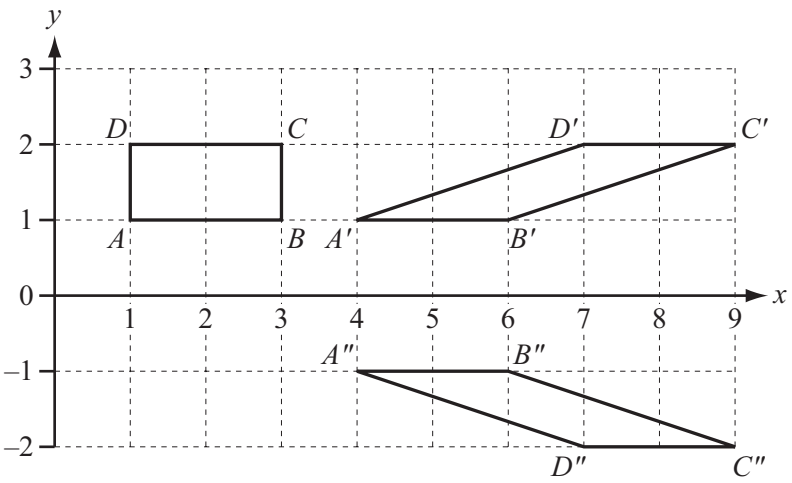
(b) Describe the correlation between the two sets of data.

Answer(b) ..... [1]

(c) Draw the line of best fit. [1]

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17



(a) Describe the **single** transformation which maps $ABCD$ onto $A'B'C'D'$.

Answer(a) ..... [3]

(b) A single transformation maps $A'B'C'D'$ onto $A''B''C''D''$.
Find the matrix which represents this transformation.

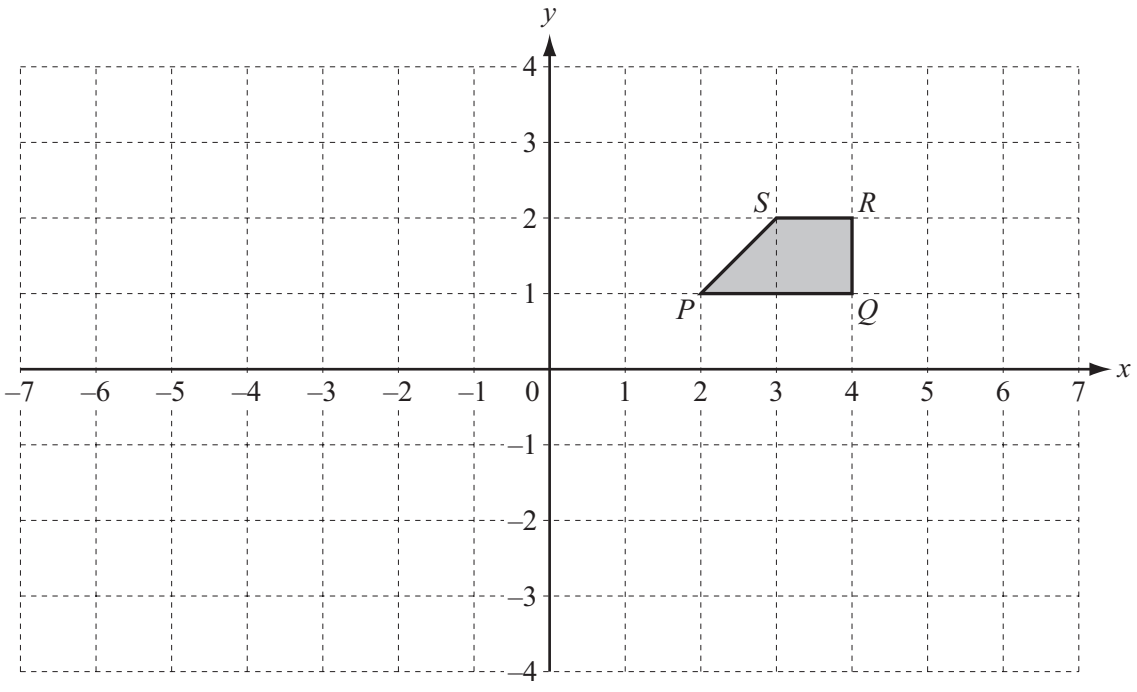
Answer(b) $\begin{pmatrix} & \\ & \end{pmatrix}$ [2]

---

18 $\mathbf{A} = \begin{pmatrix} 0 & 1 \\ 1 & 0 \end{pmatrix}$ $\mathbf{B} = \begin{pmatrix} 0 & -1 \\ -1 & 0 \end{pmatrix}$

On the grid on the next page, draw the image of $PQRS$ after the transformation represented by **BA**.

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[5]

19 $f(x) = x^2 + 1$ $\quad g(x) = \dfrac{x+2}{3}$

(a) Work out $ff(-1)$.

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

(b) Find $gf(3x)$, simplifying your answer as far as possible.

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

(c) Find $g^{-1}(x)$.

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

Question 20 is printed on the next page.

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20 **(a)** The two lines $y = 2x + 8$ and $y = 2x - 12$ intersect the x-axis at P and Q.

Work out the distance PQ.

Answer(a) $PQ =$ ..... [2]

(b) Write down the equation of the line with gradient -4 passing through (0, 5).

Answer(b) ..... [2]

(c) Find the equation of the line parallel to the line in **part (b)** passing through (5, 4).

Answer(c) ..... [3]

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