UNIVERSITY OF CAMBRIDGE INTERNATIONAL EXAMINATIONS
International General Certificate of Secondary Education

CANDIDATE NAME									
CENTRE NUMBER						CANDIDATE NUMBER			

7953581407

MATHEMATICS **0580/03**

Paper 3 (Core) **October/November 2009**

2 hours

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 soft pencil for any diagrams or graphs.
Do not use staples, paper clips, highlighters, glue or correction fluid.

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.

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

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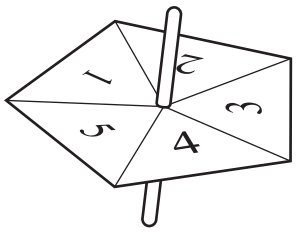

Jonah uses a fair five-sided spinner in a game.

(a) What is the probability that the spinner lands on

(i) 3,

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

(ii) an even number,

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

(iii) a number greater than 5?

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

(b) Jonah spins the spinner 25 times and records the results in a frequency table.

Number that the spinner lands on	Frequency
1	8
2	4
3	5
4	
5	2

(i) Fill in the missing number. [1]

(ii) Write down the mode.

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

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(iii) Calculate the mean.

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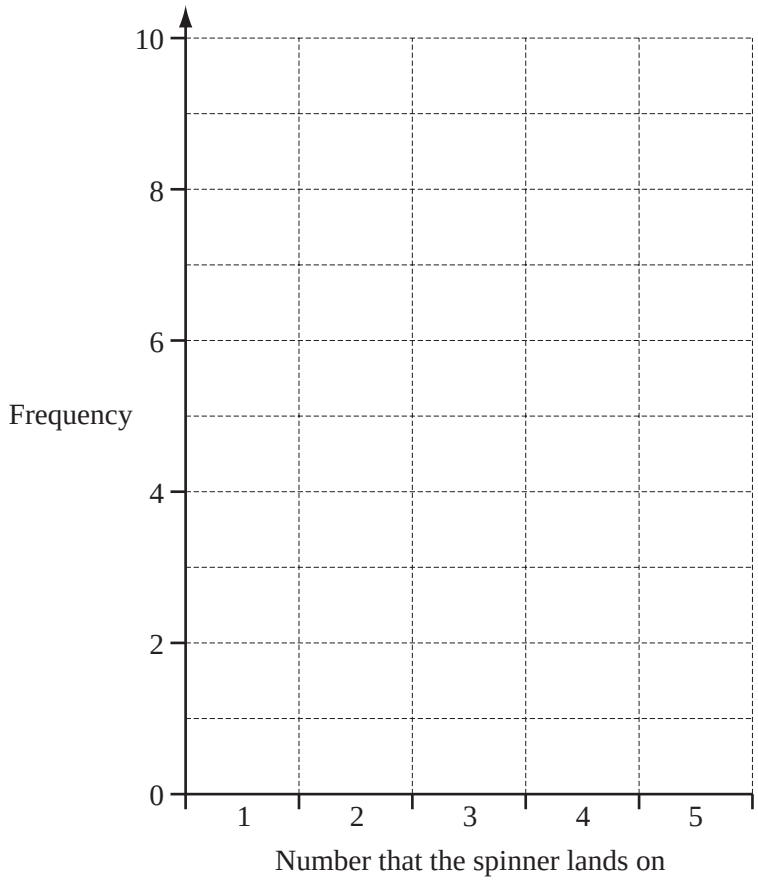
Answer(b)(iii) ..... [3]

(iv) On the grid, draw a bar chart to show these results.



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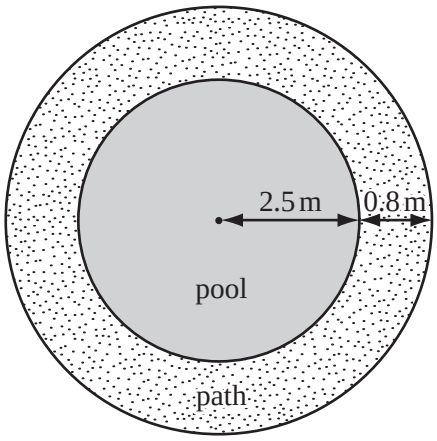

NOT TO SCALE

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The diagram shows a circular pool, of radius 2.5 metres, surrounded by a path 0.8 metres wide.

(a) Calculate

(i) the perimeter of the pool,

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

(ii) the area of the pool,

Answer(a)(ii) ..... m^2 [2]

(iii) the area of the path.

Answer(a)(iii) ..... m^2 [2]

(b) The water in the pool has a depth of 0.4 metres.
Calculate the volume of water in the pool.
Give your answer in litres. [1 cubic metre = 1000 litres.]

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

(c) When the pool is emptied for cleaning, the water flows out at a rate of 250 litres each minute.
Calculate how long it takes to empty the pool.
Give your answer to the nearest minute.

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

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3 **(a)** Bruce mixes blue and yellow paint to make green paint.
He uses blue and yellow paint in the ratio blue : yellow = 7 : 3.

(i) He makes 15 litres of green paint.
How many litres of yellow paint does he use?

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

(ii) He buys the yellow paint in tins. Each tin contains 2 litres of paint.
Write down the number of tins of yellow paint he buys.

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

(b) Tins of red paint cost \$9.25 each.
In a sale, the shop reduces the price by 12%.

(i) Calculate the sale price.

Answer(b)(i) \$ ..... [3]

(ii) Bruce buys 4 tins of red paint in the sale.
How much does he pay?

Answer(b)(ii) \$ ..... [1]

(iii) Before the sale, he bought 5 tins at \$9.25 each.
Calculate how much he paid for these 5 tins.

Answer(b)(iii) \$ ..... [1]

(iv) Use **parts (b)(ii)** and **(b) (iii)** to find the average (mean) price he paid for a tin of red paint.

Answer(b)(iv) \$ ..... [3]

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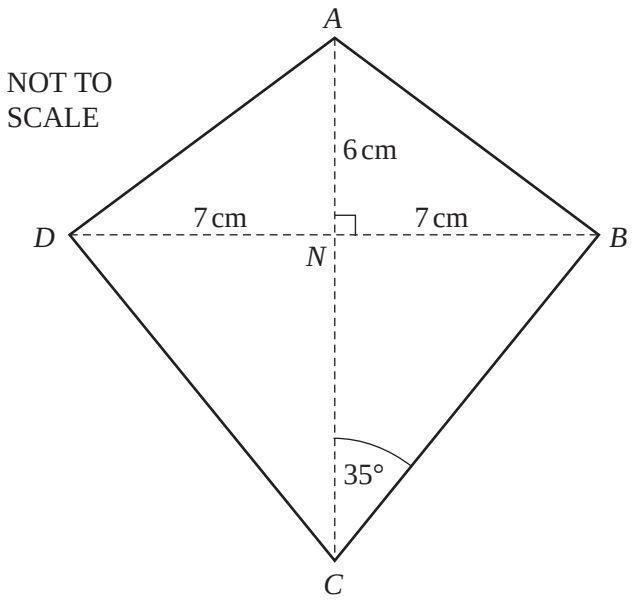

The diagram shows a kite $ABCD$, with $AB = AD$ and $DC = BC$.
The diagonals AC and BD intersect at right angles at N.
$AN = 6$ cm and $NB = ND = 7$ cm.
Angle $BCN = 35°$.

(a) (i) What is the mathematical name for triangle BCD?

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

(ii) Complete the following statement.

Triangle BNC is congruent to triangle ..... [1]

(iii) Write down the size of angle DCB.

Answer(a)(iii) Angle DCB = ... [1]

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(b) (i) Use trigonometry to calculate the size of angle *NAB*.

Answer(b)(i) Angle *NAB* = ... [2]

(ii) Calculate the length of *AB*.

Answer(b)(ii) *AB* = ... cm [2]

(c) Use trigonometry to calculate the length of *BC*.

Answer(c) BC = ... cm [3]

(d) Calculate the perimeter of the kite.

Answer(d) ..... cm [2]

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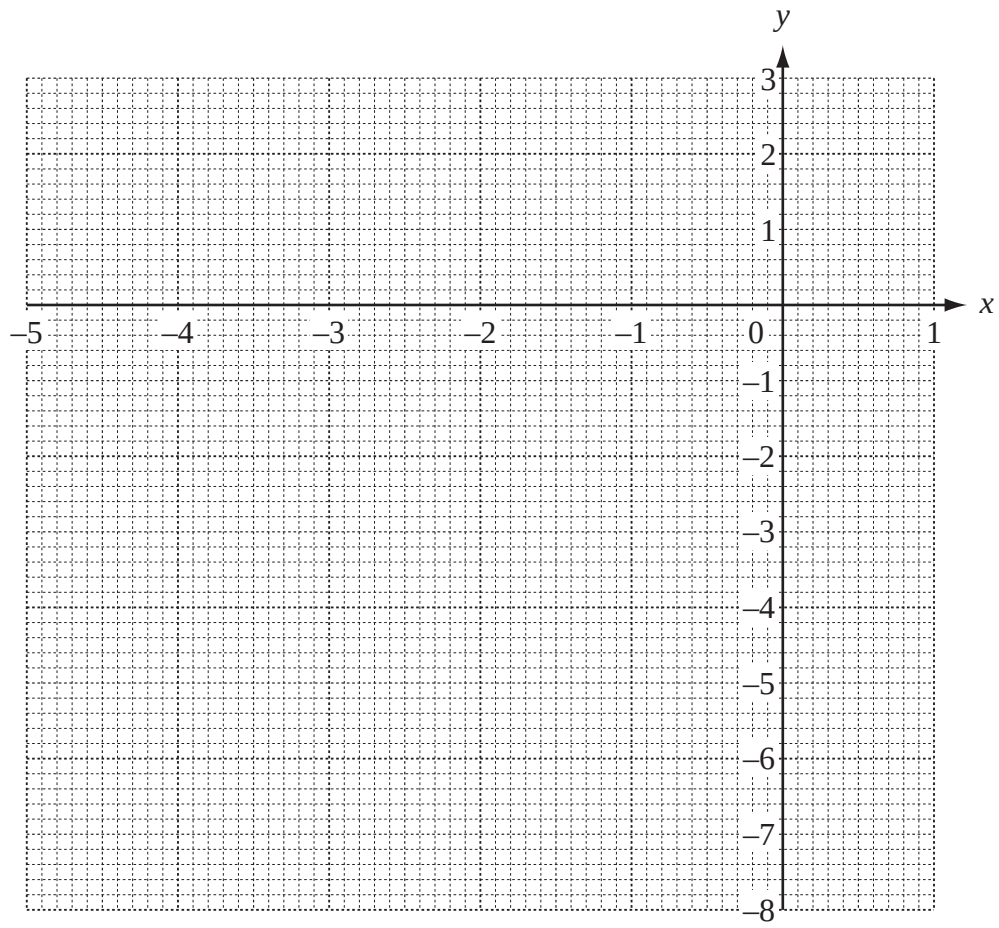
5 **(a)** Complete the table of values for $y = x^2 + 4x - 3$.

x	−5	−4	−3	−2	−1	0	1
y		−3		−7	−6	−3	

[3]

(b) On the grid below draw the graph of $y = x^2 + 4x - 3$ for $-5 \leqslant x \leqslant 1$.



[4]

(c) **(i)** Write down the co-ordinates of the lowest point of the graph.

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

(ii) Write down the solutions of the equation $x^2 + 4x - 3 = 0$.

Answer(c)(ii) $x =$ ..... or $x =$ ..... [2]

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(d) (i) Mark the point $(-2, 1)$ on the grid and label it A. [1]

(ii) Draw the straight line joining A to the point where the graph of $y = x^2 + 4x - 3$ cuts the y-axis. [1]

(iii) Find the gradient of your line.

Answer(d)(iii) ..... [2]

(iv) Write down the equation of your line in the form $y = mx + c$.

Answer(d)(iv) $y =$ ..... [2]

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6 Ravinder scores x marks in a test.

(a) Manpreet scores 4 more marks than Ravinder.
Write down Manpreet's mark in terms of x.

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

(b) Tamsin scores 3 times as many marks as Ravinder.
Write down Tamsin's mark in terms of x.

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

(c) (i) Write down and simplify the total of the three marks in terms of x.

Answer(c)(i) ..... [2]

(ii) The mean of these marks is 28. Show that $5x + 4 = 84$.

Answer (c)(ii)

[1]

(iii) Solve the equation $5x + 4 = 84$.

Answer(c)(iii) $x =$ ..... [2]

(d) What mark did Tamsin score?

Answer(d) ..... [1]

(e) Dinesh scored 63 marks out of 75.
Work out the mark Dinesh scored as a percentage.

Answer(e) ..... % [2]

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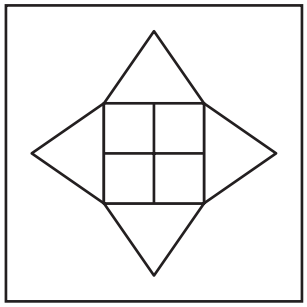

Peter makes square tiles, like the one shown above.

(a) Write down the order of rotational symmetry of the tile.

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

(b) On the diagram, draw all the lines of symmetry of the tile. [2]

(c) Charles orders 2800 tiles from Peter at 1.75 euros (€) each.
He pays Peter €2300 now.
Calculate the amount he still has to pay.

Answer(c) € ..... [3]

(d) Peter changes the €2300 into dollars ($) when the exchange rate is €1 = $1.348.
Calculate how many dollars Peter receives.
Give your answer correct to 2 decimal places.

Answer(d) $ ..... [2]

(e) Peter borrows $5000 from a bank at a rate of 9.2% per year **compound** interest.
Calculate the amount he owes after 2 years.
Give your answer correct to 2 decimal places.

Answer(e) $ ..... [3]

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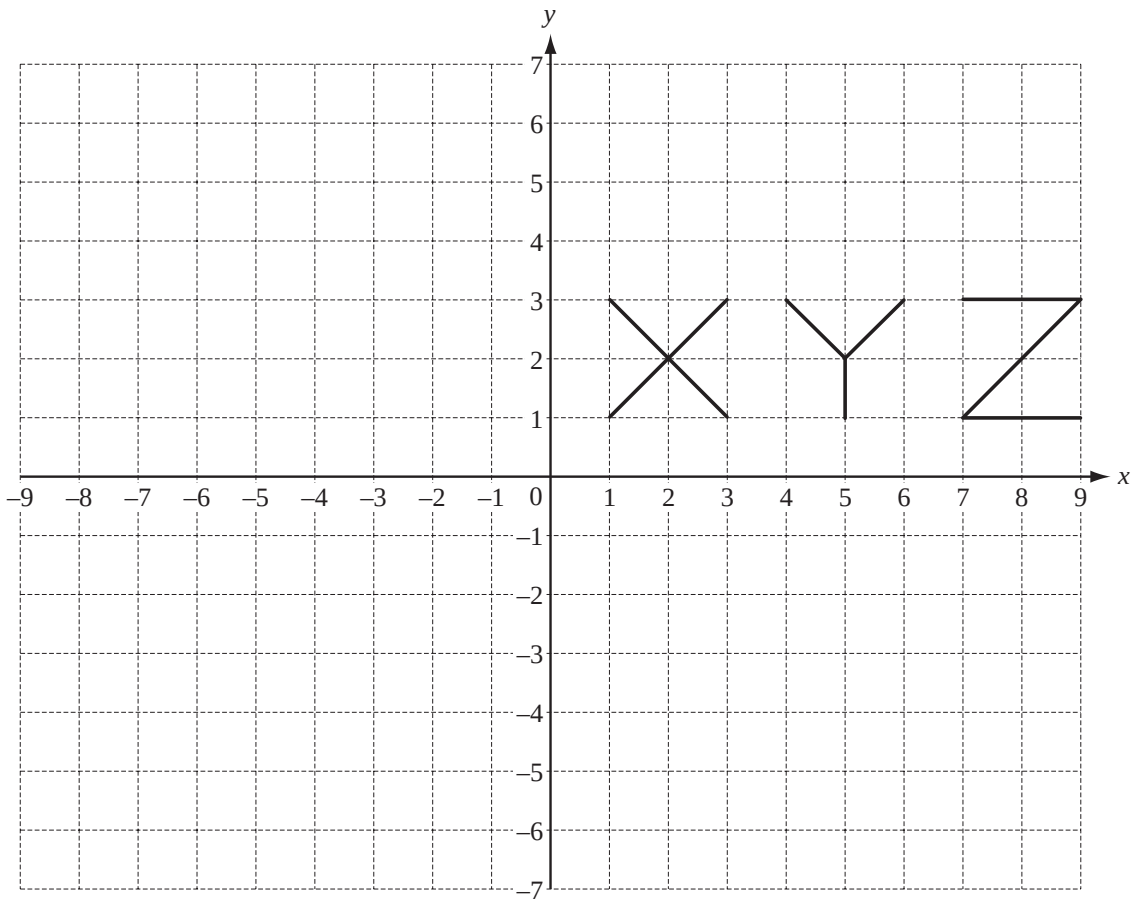

(a) On the grid,

(i) translate X by the vector $\begin{pmatrix} -7 \\ 2 \end{pmatrix}$, [2]

(ii) rotate Y through 90° anticlockwise about the origin. [2]

(b) (i) On the grid, reflect Z in the x-axis. This is the image Z_1. [2]

(ii) On the grid, reflect the image Z_1 in the line $x = 4$. This is the image Z_2. [2]

(iii) Describe a **single** transformation which maps the image Z_2 onto the original Z.

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

Question 9 is printed on the next page.

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9

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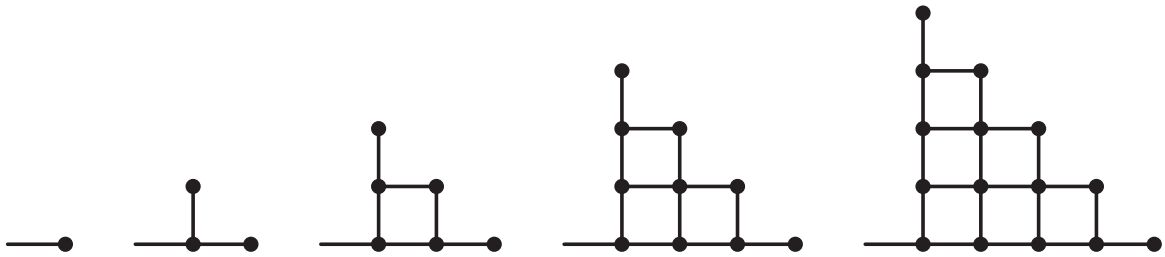

Diagram 1 Diagram 2 Diagram 3 Diagram 4 Diagram 5

The diagrams show a pattern of lines and dots.

(a) Complete the table below.

Diagram number	1	2	3	4	5
Number of lines	1	3	7		
Number of dots	1	3	6		

[4]

(b) Work out the number of lines and the number of dots in Diagram 7.

Answer(b) Number of lines = ... , Number of dots = ... [2]

(c) The number of dots in Diagram n is $\frac{1}{2}n(n+1)$.

(i) Use this formula to check your result for Diagram 5.
You must show your working.
Answer (c)(i)

[2]

(ii) How many dots are there in Diagram 20?

Answer(c)(ii) ..... [2]

(d) The number of lines in Diagram n is $n^2 + kn + 1$.
Use the information about Diagram 3 from the table to calculate the value of k.

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

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