UNIVERSITY OF CAMBRIDGE INTERNATIONAL EXAMINATIONS
International General Certificate of Secondary Education

CANDIDATE NAME									
CENTRE NUMBER						CANDIDATE NUMBER			

5608091386

MATHEMATICS **0580/33**

Paper 3 (Core) **May/June 2011**

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 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 104.

This document consists of **15** printed pages and **1** blank page.

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For Examiner's Use

1 At a theatre, adult tickets cost \$5 each and child tickets cost \$3 each.

(a) Find the total cost of 110 adult tickets and 85 child tickets.

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

(b) The total cost of some tickets is \$750.
There are 120 adult tickets.

Work out the number of child tickets.

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

(c) The ratio of the **number** of adults to the **number** of children during one performance is

adults : children = 3 : 2.

(i) The total number of adults and children in the theatre is 150.

Find the number of adults in the theatre.

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

(ii) For this performance, find the ratio **total cost** of adult tickets : **total cost** of child tickets.
Give your answer in its simplest form.

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

(d) The \$5 cost of an adult ticket is increased by 30%.

Calculate the new cost of an adult ticket.

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

(e) The cost of a child ticket is reduced from \$3 to \$2.70.

Calculate the percentage decrease in the cost of a child ticket.

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

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2

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(a) In the space above, construct triangle PQR with $QR = 9$ cm and $PR = 7$ cm.
Leave in your construction arcs.
The line PQ is already drawn. [2]

(b) **Using a straight edge and compasses only**, construct

(i) the perpendicular bisector of PR, [2]

(ii) the bisector of angle QPR. [2]

(c) Shade the region inside the triangle PQR which is

nearer to P than to R **and** nearer to PQ than to PR. [1]

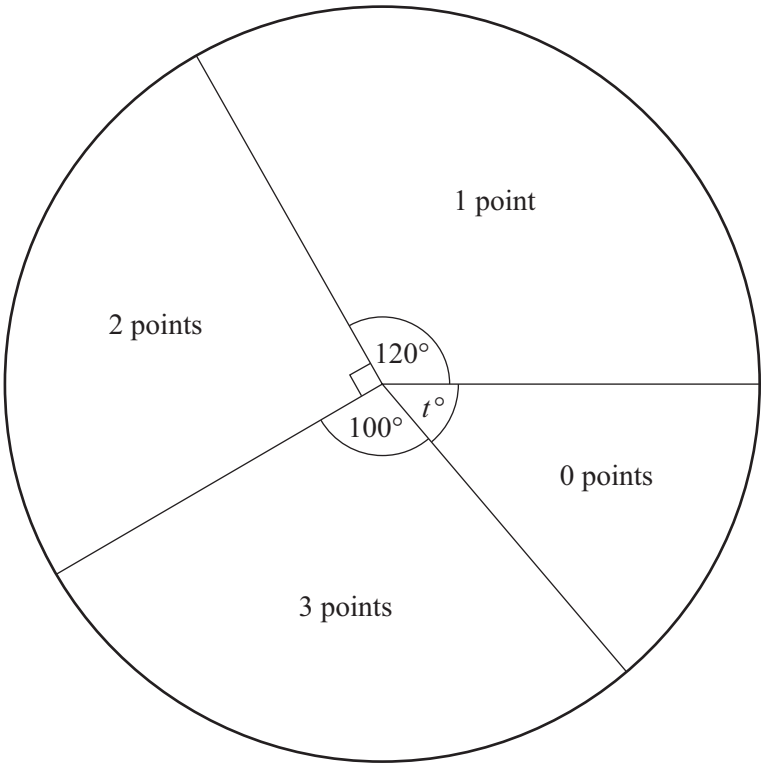
(d) Triangle PQR is a scale drawing with a scale 1 : 50 000.

Find the **actual** distance QR.
Give your answer in kilometres.

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

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3 288 students took part in a quiz.
There were three questions in the quiz.
Each correct answer scored 1 point.
The pie chart shows the results.



(a) Find the value of t.

Answer(a) $t =$ ..... [1]

(b) Find the number of students who scored 2 points.

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

(c) Find the modal number of points.

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

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(d) (i) Use the information in the pie chart to complete the frequency table for the 288 students.

Number of points	0	1	2	3
Number of students				

[2]

(ii) Calculate the mean number of points.

Answer(d)(ii) ..... [3]

(e) One student is chosen at random.

Find the probability that this student scored

(i) 3 points,

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

(ii) at least 1 point,

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

(iii) more than 3 points.

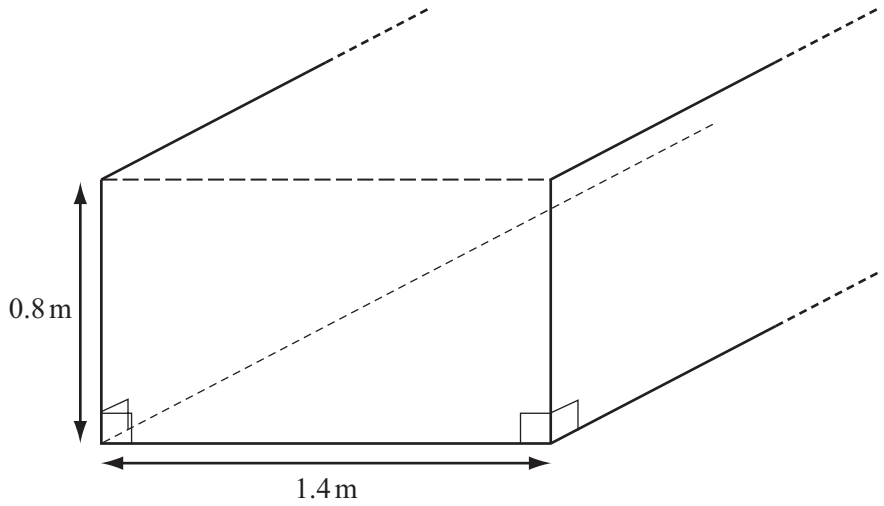
Answer(e)(iii) ..... [1]

(f) 1440 students took part in the same quiz.

How many students would be expected to score 3 points?

Answer(f) ..... [1]

4



NOT TO SCALE

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The diagram shows part of a trench.
The trench is made by removing soil from the ground.
The cross-section of the trench is a rectangle.
The depth of the trench is 0.8 m and the width is 1.4 m.

(a) Calculate the area of the cross-section.

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

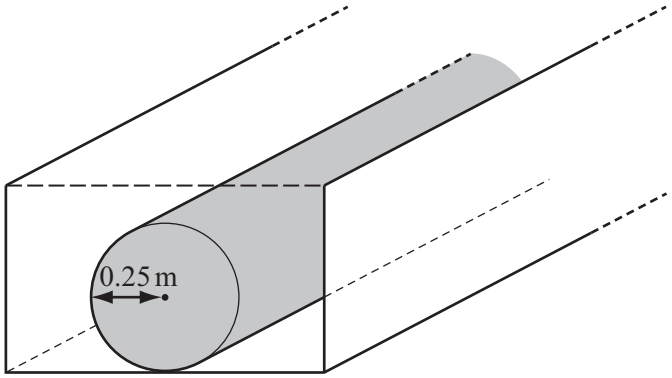
(b) The length of the trench is 200 m.

Calculate the volume of soil removed.

Answer(b) ..... m^3 [1]

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(c)



NOT TO SCALE

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A pipe is put in the trench.
The pipe is a cylinder of radius 0.25 m and length 200 m.

(i) Calculate the volume of the pipe.

[The volume, V, of a cylinder of radius r and length l is $V = \pi r^2 l$.]

Answer(c)(i) ..... m^3 [2]

(ii) The trench is then filled with soil.
Find the volume of soil put back into the trench.

Answer(c)(ii) ..... m^3 [1]

(iii) The soil which is **not used** for the trench is spread evenly over a horizontal area of 8000 m^2.

Calculate the depth of this soil.
Give your answer in **millimetres**, correct to 1 decimal place.

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

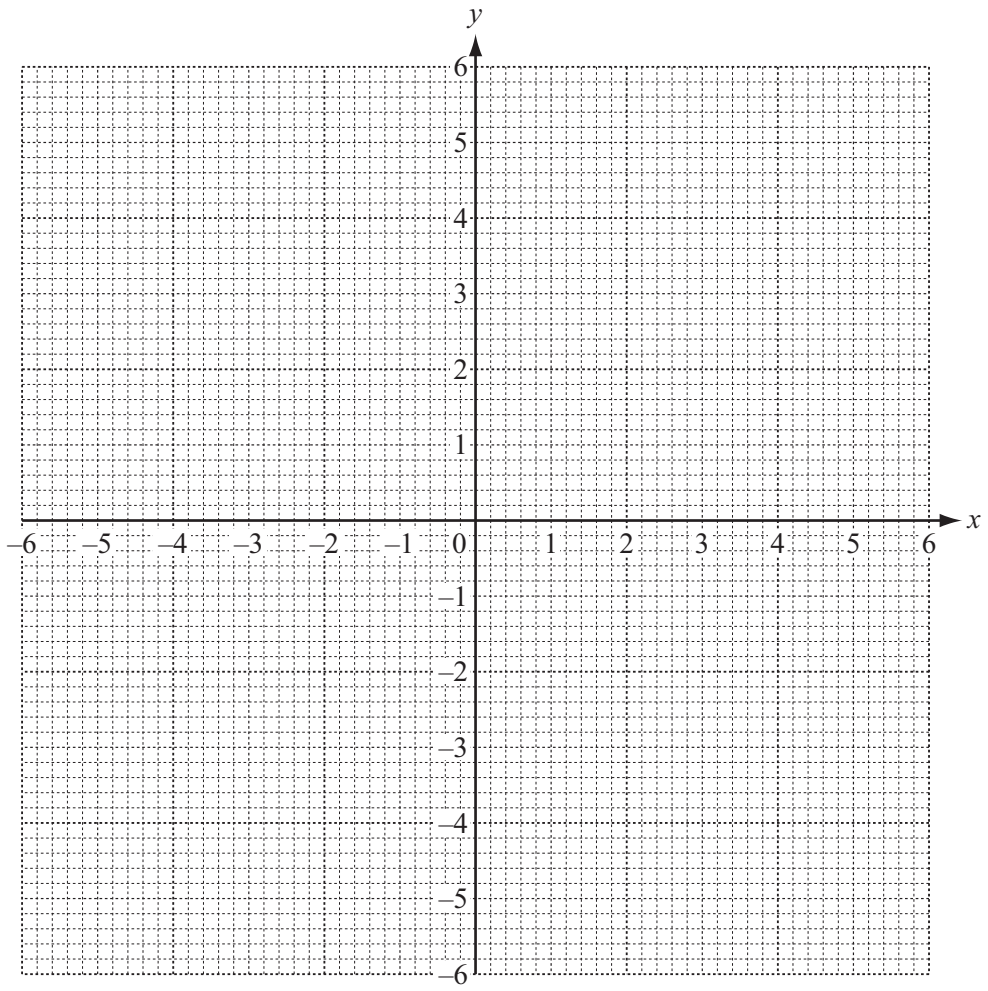
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5 **(a)** **(i)** Complete the table for the function $y = \frac{6}{x}$, $x \neq 0$.

x	–6	–5	–4	–3	–2	–1	1	2	3	4	5	6
y	–1	–1.2		–2	–3	–6	6	3			1.2	1

[2]

(ii) On the grid, draw the graph of $y = \frac{6}{x}$ for $-6 \leqslant x \leqslant -1$ and $1 \leqslant x \leqslant 6$.



[4]

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(b) (i) Complete the table for the function $y = \frac{x^2}{2} - 2$.

x	–4	–3	–2	–1	0	1	2	3	4
y	6	2.5			–2			2.5	6

[2]

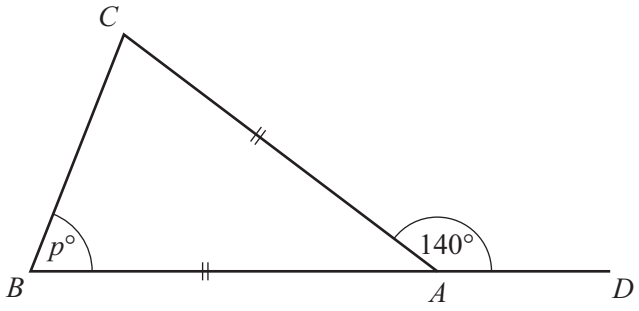
(ii) On the grid opposite, draw the graph of $y = \frac{x^2}{2} - 2$ for $-4 \leqslant x \leqslant 4$. [4]

(c) Write down the co-ordinates of the point of intersection of the two graphs.

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

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6 (a)

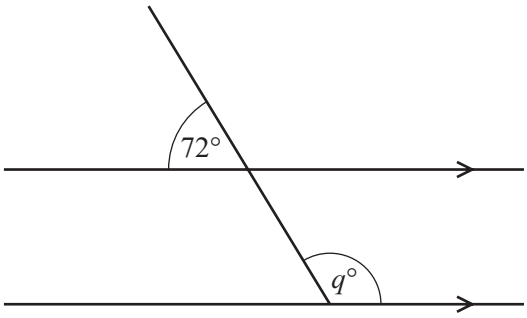


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The diagram shows a triangle ABC with BA extended to D.
$AB = AC$ and angle $CAD = 140°$.
Find the value of p.

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

(b)

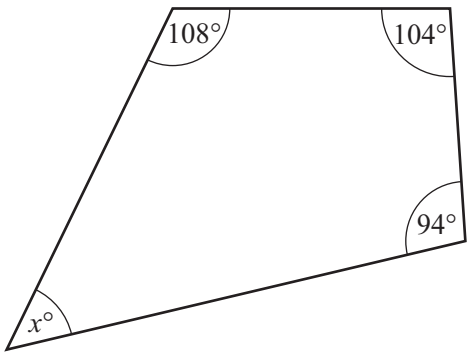


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Find the value of q.

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

(c)



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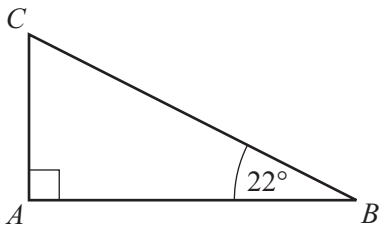
Find the value of x.

Answer(c) $x =$ ..... [1]

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(d)



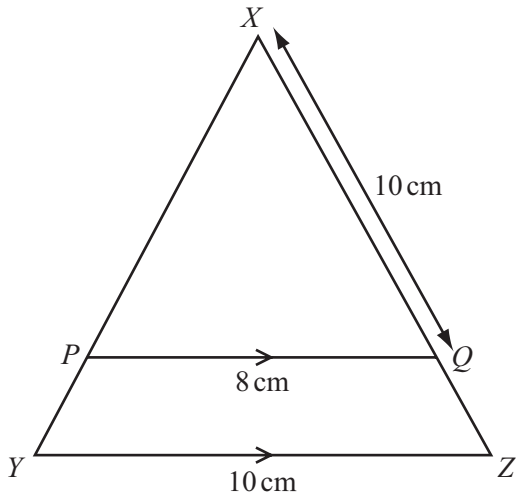
NOT TO SCALE

In triangle ABC, angle $A = 90°$ and angle $B = 22°$.

Calculate angle C.

Answer(d) Angle C = ... [1]

(e)



NOT TO SCALE

In triangle XYZ, P is a point on XY and Q is a point on XZ.
PQ is parallel to YZ.

(i) Complete the statement.

Triangle XPQ is ..... to triangle XYZ. [1]

(ii) $PQ = 8$ cm, $XQ = 10$ cm and $YZ = 10$ cm.

Calculate the length of XZ.

Answer(e)(ii) XZ = ... cm [2]

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7 **(a)** Solve the equations.

(i) $2x + 3 = 15 - x$

Answer(a)(i) $x =$ ..... [2]

(ii) $\frac{2y-1}{3} = 7$

Answer(a)(ii) $y =$ ..... [2]

(iii) $2 = \frac{1}{u-1}$

Answer(a)(iii) $u =$ ..... [3]

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(b) Write down equations to show the following.

(i) p is equal to r plus two times q.

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

(ii) k is equal to the square of the sum of l and m.

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

(c) Pierre walks for 2 hours at w km/h and then for another 3 hours at $(w - 1)$ km/h.

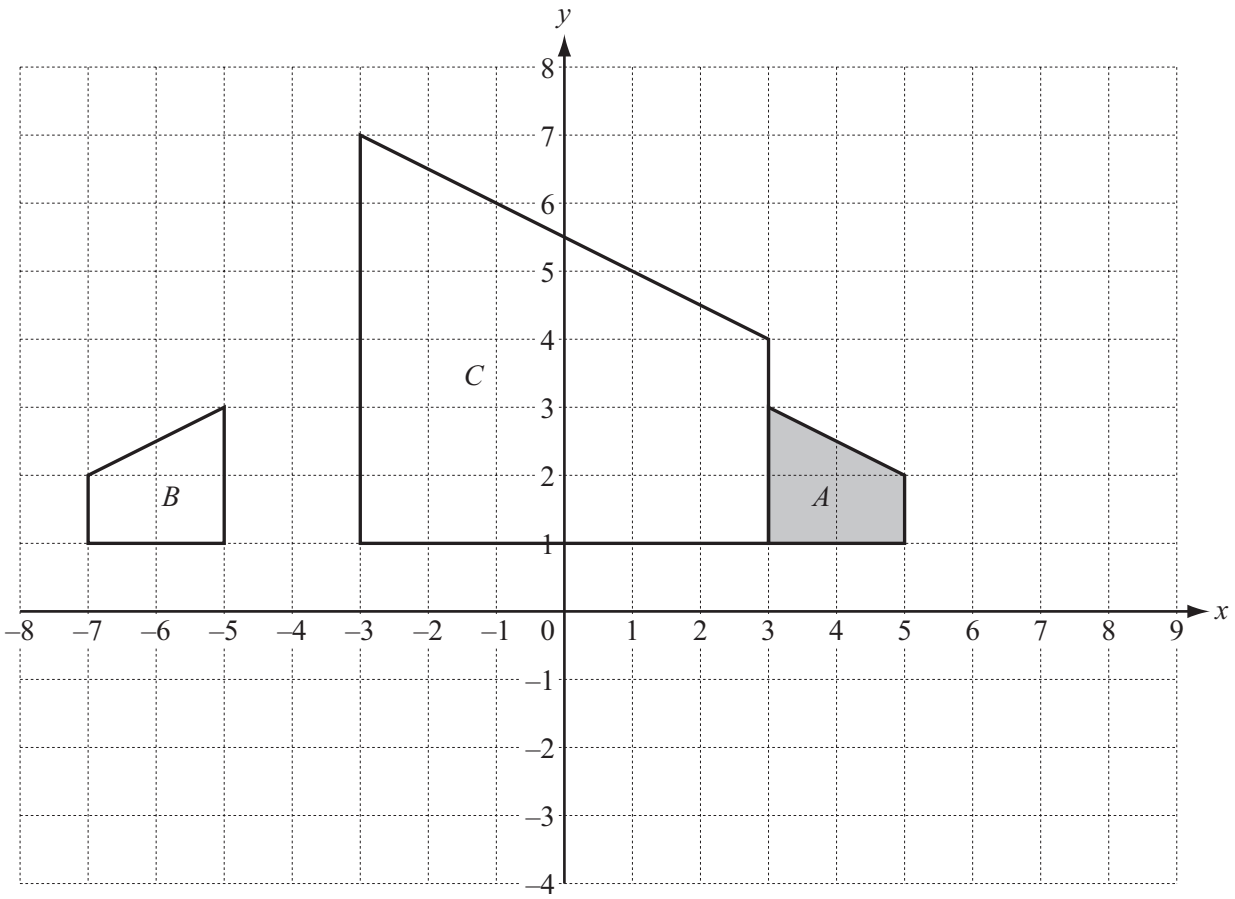
The total distance of Pierre's journey is 11.5 km.

Find the value of w.

Answer(c) $w =$ ..... [4]

8

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(a) On the grid, draw the images of the following transformations of **shape *A***.

(i) Reflection in the x-axis [1]

(ii) Translation by the vector $\begin{pmatrix} 3 \\ 4 \end{pmatrix}$ [2]

(iii) Rotation, centre (0, 0), through 180° [2]

(b) Describe fully the **single** transformation that maps

(i) shape A onto shape B,

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

(ii) shape A onto shape C.

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

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9



Diagram 1 Diagram 2 Diagram 3 Diagram 4 Diagram 5

The Diagrams above form a pattern.

(a) Draw Diagram 5 in the space provided. [1]

(b) The table shows the numbers of dots in some of the diagrams.
Complete the table.

Diagram	1	2	3	4	5		10		*n*
Number of dots	3	5							

[5]

(c) What is the value of *n* when the number of dots is 737?

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

(d) Complete the table which shows the **total** number of dots in consecutive pairs of diagrams.

For example, the **total** number of dots in Diagram 2 and Diagram 3 is 12.

Diagrams	1 and 2	2 and 3	3 and 4	4 and 5		10 and 11		*n* and *n* + 1
Total number of dots	8	12	16					

[3]

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