UNIVERSITY OF CAMBRIDGE INTERNATIONAL EXAMINATIONS
International General Certificate of Secondary Education

CANDIDATE NAME									
CENTRE NUMBER						CANDIDATE NUMBER			

7622674831 4

MATHEMATICS **0580/03, 0581/03**

Paper 3 (Core) **May/June 2008**

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.
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.

For Examiner's Use

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

For Examiner's Use

1 Alphonse, his wife and child fly from Madrid to the Olympic Games in Beijing.
The adult plane fare is 450 euros.
The child fare is 68% of the adult fare.

(a) Show that the total plane fare for the family is 1206 euros. Show all your working clearly.

Answer (a)

[3]

(b) The ratio of the money spent on plane fares : accommodation : tickets = 6 : 5 : 3.

Calculate the **total** cost.

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

(c) Alphonse changes 500 euros into Chinese Yuan at a rate of 1 euro = 9.91 Chinese Yuan.

How many Chinese Yuan does he receive?

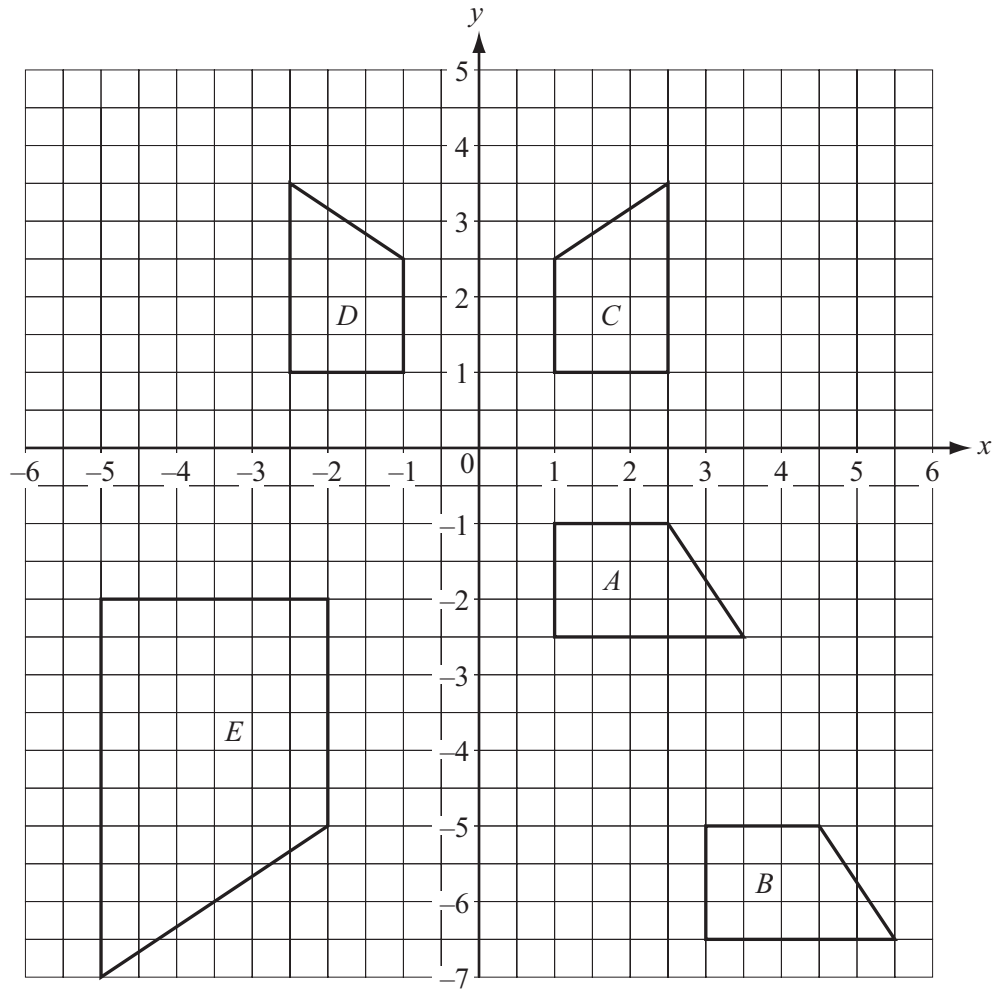
Answer(c) ..... Yuan [2]

(d) Their plane leaves Madrid at 05 45. The journey takes 11 hours 35 minutes.
Beijing time is 6 hours ahead of Madrid time.

Find the time in Beijing when they arrive.

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

2



Describe fully the **single** transformation which maps

(a) A onto B,

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

(b) C onto D,

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

(c) A onto C,

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

(d) C onto E.

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

For Examiner's Use

3 Marie counts the number of people in each of 60 cars one morning.

(a) She records the first 40 results as shown below.

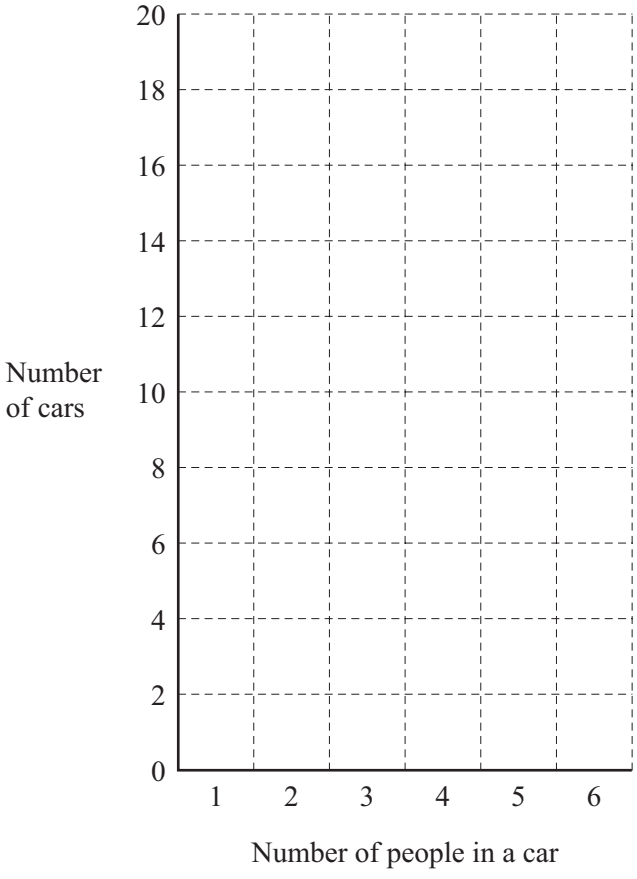
Number of people in a car	Tally	Number of cars
1	𝍸	
2	𝍸 𝍸	
3	𝍸 |	
4	𝍸 |	
5	𝍸 ||	
6	𝍸 |	

The remaining 20 results are

2, 2, 5, 2, 2, 4, 2, 6, 5, 3, 4, 5, 4, 6, 2, 5, 3, 2, 1, 6.

(i) Use these results to complete the frequency table above. [2]

(ii) On the grid below, draw a bar chart to show the information for the 60 cars.



[1]

For Examiner's Use

(iii) Write down the mode.

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

(iv) Find the median.

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

(v) Work out the mean.

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

(b) Manuel uses Marie's results to draw a pie chart.

Work out the sector angle for the number of cars with 5 people.

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

For Examiner's Use

4 **(a)** Solve the equations

(i) $3x - 4 = 14$,

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

(ii) $\frac{y+1}{5} = 2$,

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

(iii) $3(2z - 7) - 2(z - 3) = -9$.

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

(b) Donna sent p postcards and q letters to her friends.

(i) The total number of postcards and letters she sent was 12.

Write down an equation in p and q.

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

(ii) A stamp for a postcard costs 25 cents and a stamp for a letter costs 40 cents.
She spent 375 cents on stamps altogether.

Write down another equation in p and q.

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

(iii) Solve these equations to find the values of p and q.

Answer(b)(iii) $p =$ ..... and $q =$ ..... [3]

5 **(a)** **(i)** Calculate the area of a circle with radius 3.7 centimetres.

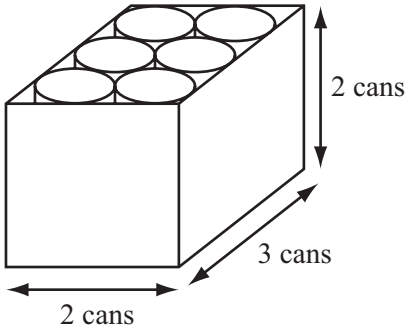
Answer(a)(i) ..... cm^2 [2]

(ii) A can of tomatoes is a cylinder with radius 3.7 centimetres and height h centimetres. The volume of the cylinder is 430 cubic centimetres.

Calculate h.

Answer(a)(ii) h = ... [2]

NOT TO SCALE



(b) Twelve cans fit exactly inside a box 3 cans long, 2 cans wide and 2 cans high.

(i) Write down the length, width and height of the box.

Answer(b)(i) length = ... cm

width = ... cm

height = ... cm [3]

(ii) Calculate the volume of the box.

Answer(b)(ii) ..... cm^3 [2]

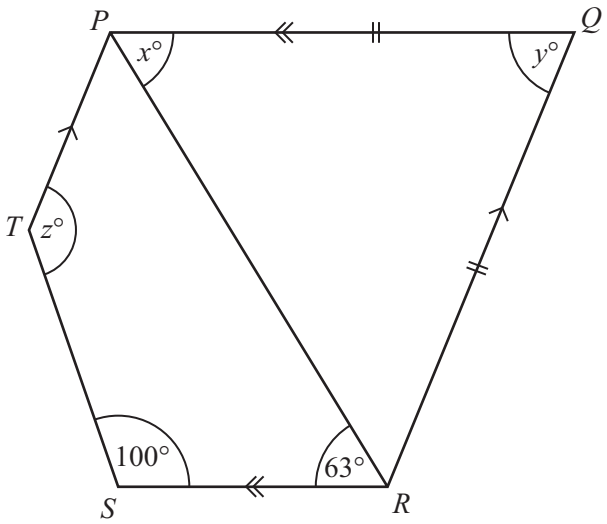
(iii) Calculate the percentage of the volume of the box occupied by the cans.

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

[Turn over

6

NOT TO SCALE



(a) In the diagram PQ is parallel to SR, and QR is parallel to PT.
$PQ = QR$, angle $PRS = 63°$ and angle $RST = 100°$.

Find the value of

(i) x,

Answer(a)(i) $x =$ ..... [1]

(ii) y,

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

(iii) z.

Answer(a)(iii) $z =$ ..... [2]

(b) The shape of a flower bed is a regular octagon, $ABCDEFGH$, with sides of 4 metres.

(i) Show that the interior angle of a regular octagon is 135°.

Answer(b)(i)

[2]

For Examiner's Use

(ii) Use a ruler and protractor to complete an accurate scale drawing of the flower bed.
Use a scale of 1 centimetre to represent 1 metre.
The line AB and the centre O are already shown.

For Examiner's Use

[2]

(iii) Measure and write down the distance from the centre, O, to the mid-point of AB.

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

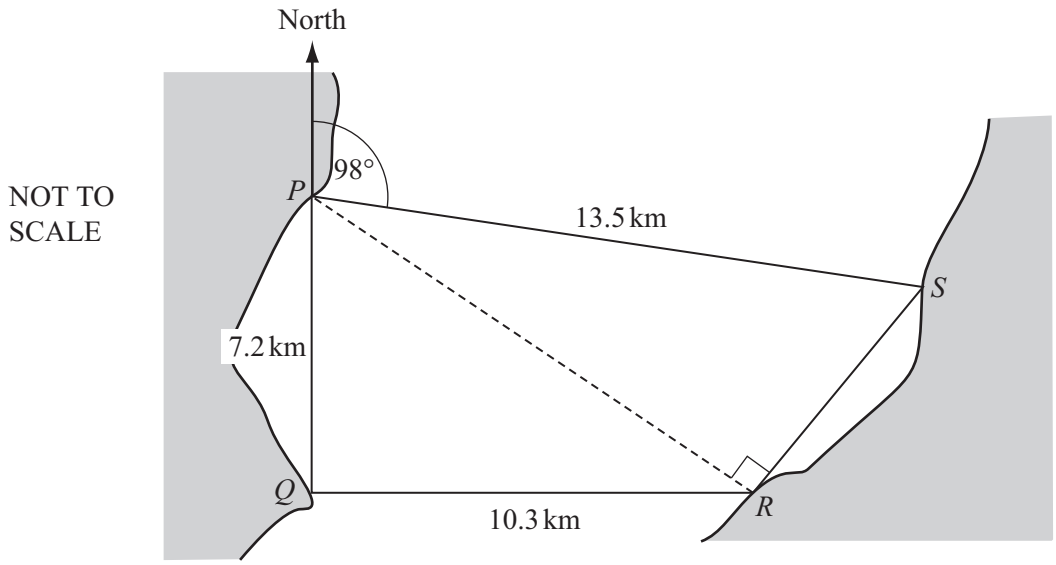
(iv) Calculate the area of triangle OAB in the scale drawing.

Answer(b)(iv) ..... cm^2 [2]

(v) Calculate the actual area of the flower bed.

Answer(b)(v) ..... m^2 [1]

7



P, *Q*, *R* and *S* are ferry ports on a wide river, as shown in the diagram above.

A ferry sails from *P*, stopping at *Q*, *R* and *S* before returning to *P*.

(a) *Q* is 7.2 kilometres due south of *P* and *R* is 10.3 kilometres due east of *Q*.

(i) Show by calculation that angle *QPR* = 55°.

Answer(a)(i)

[2]

(ii) Write down the bearing of *R* from *P*.

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

(b) The bearing of *S* from *P* is 098° and *SP* = 13.5 km.

(i) Explain why angle *RPS* = 27°.

Answer (b)(i)

[1]

(ii) Angle *PRS* = 90°. Calculate the distance *RS*.

Answer(b)(ii)*RS* = ... km [2]

For Examiner's Use

(iii) Find the total distance the ferry sails.

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

(c) The total sailing time for the ferry is 4 hours 30 minutes.

Calculate the average sailing speed, in kilometres per hour, for the whole journey.

Answer(c) ..... km/h [2]

For Examiner's Use

8 **(a)** The width of a rectangle is x centimetres.

The length of the rectangle is 3 centimetres more than the width.

Write down an expression, in terms of x, for

(i) the length of the rectangle,

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

(ii) the area of the rectangle.

Answer(a)(ii) ..... cm^2 [1]

(iii) The area of the rectangle is 7 square centimetres.

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

Answer (a)(iii)

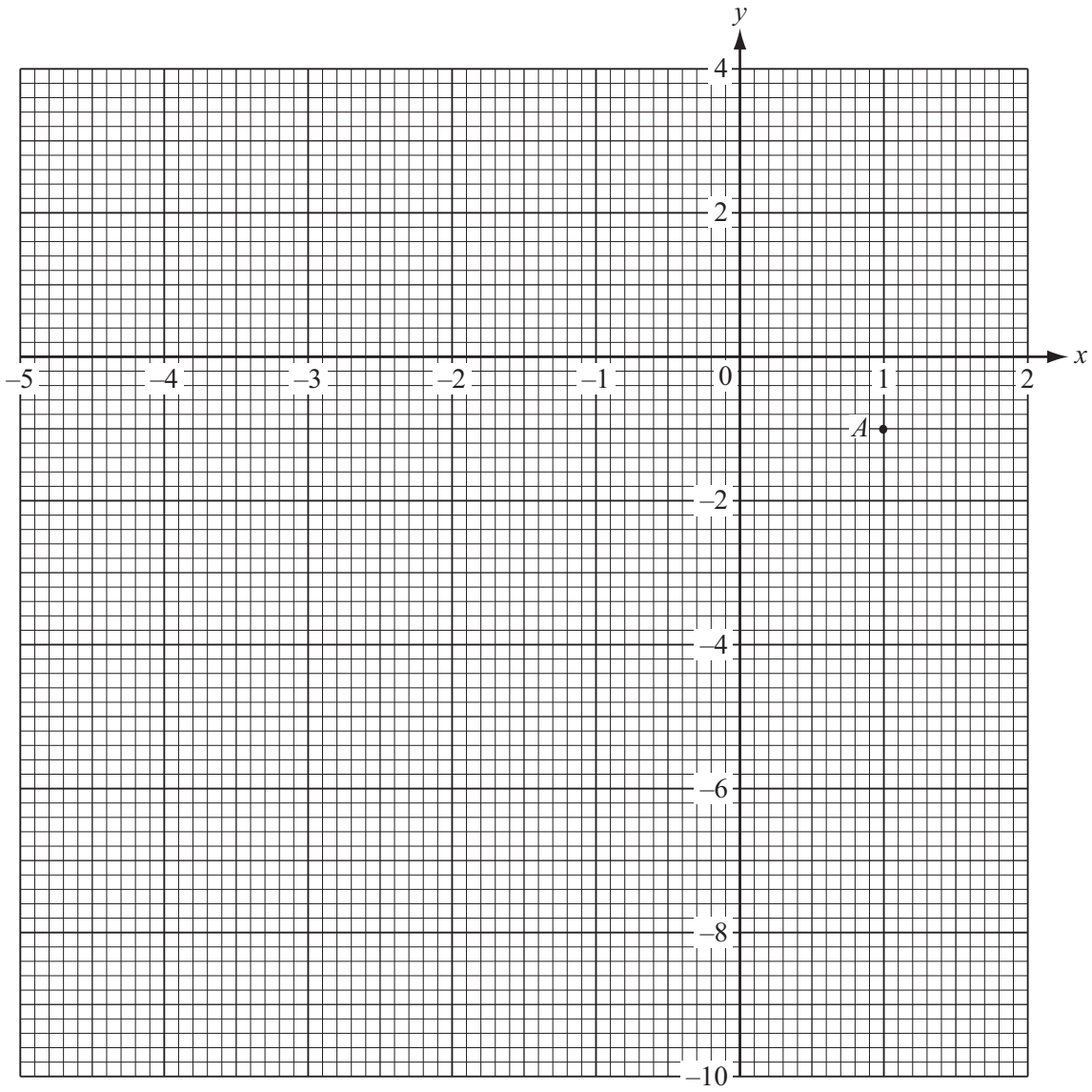
[1]

(b) **(i)** Complete the tables of values for the equation $y = x^2 + 3x - 7$.

x	−5	−4	−3	−2	−1	0	1	2
y	3		−7	−9		−7		3

[3]

(ii) On the grid below, draw the graph of $y = x^2 + 3x - 7$ for $-5 \leqslant x \leqslant 2$.



[4]

(c) **(i)** Use your graph to find the solutions to the equation $x^2 + 3x - 7 = 0$.

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

(ii) Find the length of the rectangle in **part (a)**.

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

(d) The point $A(1, -1)$ is marked on the grid.

(i) Draw a straight line through A with a gradient of 2. [1]

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

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

For Examiner's Use

9 In this question, all construction arcs must be shown clearly.

Jalal buys an area of land on which to build a school.

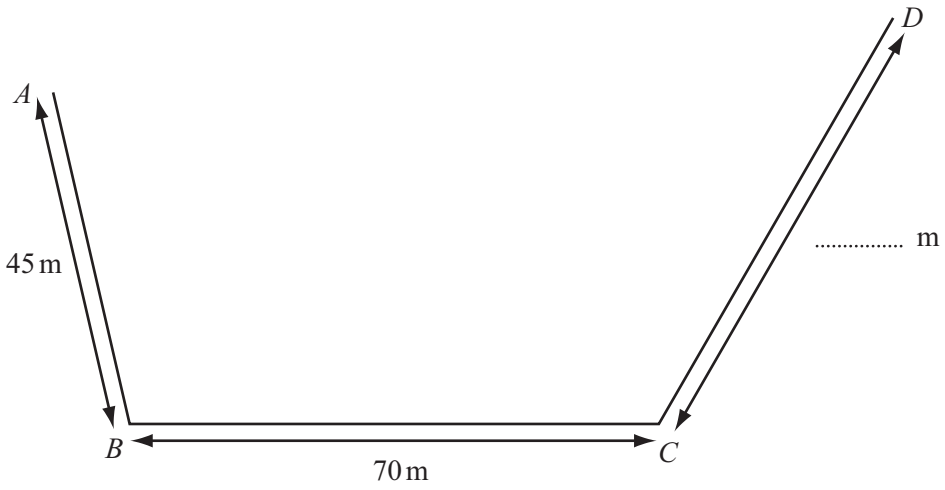
The land, *ABCDE*, is in the shape of a polygon with 5 sides.

(a) Write down the mathematical name of this polygon.

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

(b) Jalal starts to make an accurate plan of the land, as shown below.

He uses a scale of 1 centimetre to represent 10 metres.



(i) The actual lengths of *AB* and *BC* are written on the plan.

Write the actual length of *CD* on the plan. [1]

(ii) Use compasses to find the point *E* such that *AE* = 64 m and *DE* = 58 m.

Draw the lines *AE* and *DE*. [2]

For Examiner's Use

(c) The land is to be divided into distinct regions.

Construct, using a straight edge and compasses only,

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

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

(d) The music department building will be nearer to B than to C **and** nearer to BC than to BA.

Write a letter M on the plan where the music department could be. [1]

(e) The school gate, PQ, will be 8 metres wide.

It will lie along AB so that $AP = QB$.

Mark P and Q accurately on the plan. [2]