UNIVERSITY OF CAMBRIDGE INTERNATIONAL EXAMINATIONS
International General Certificate of Secondary Education

CANDIDATE
NAME

CENTRE
NUMBER

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NUMBER

CAMBRIDGE INTERNATIONAL MATHEMATICS **0607/03**

Paper 3 (Core) **For Examination from 2010**

SPECIMEN PAPER

1 hour 45 minutes

Candidates answer on the Question Paper

Additional Materials: Graphics Calculator
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.
Do not use staples, paper clips, highlighters, glue or correction fluid.
You may use a pencil for any diagrams or graphs.

Answer **all** the questions.
Unless instructed otherwise, give your answers exactly or to three significant figures as appropriate.
Answers in degrees should be given to one decimal place.
For π, use your calculator value.
You must show all relevant working to gain full marks and you will be given marks for correct methods even if your answer is incorrect.
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 96.

For Examiner's Use

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

[Turn over

Formula List

Area, A, of triangle, base b, height h. $\qquad A = \dfrac{1}{2}bh$

Area, A, of circle, radius r. $\qquad A = \pi r^2$

Circumference, C, of circle, radius r. $\qquad C = 2\pi r$

Curved surface area, A, of cylinder of radius r, height h. $\qquad A = 2\pi rh$

Curved surface area, A, of cone of radius r, sloping edge l. $\qquad A = \pi rl$

Curved surface area, A, of sphere of radius r. $\qquad A = 4\pi r^2$

Volume, V, of prism, cross-sectional area A, length l. $\qquad V = Al$

Volume, V, of pyramid, base area A, height h. $\qquad V = \dfrac{1}{3}Ah$

Volume, V, of cylinder of radius r, height h. $\qquad V = \pi r^2 h$

Volume, V, of cone of radius r, height h. $\qquad V = \dfrac{1}{3}\pi r^2 h$

Volume, V, of sphere of radius r. $\qquad V = \dfrac{4}{3}\pi r^3$

Answer **all** the questions.

1
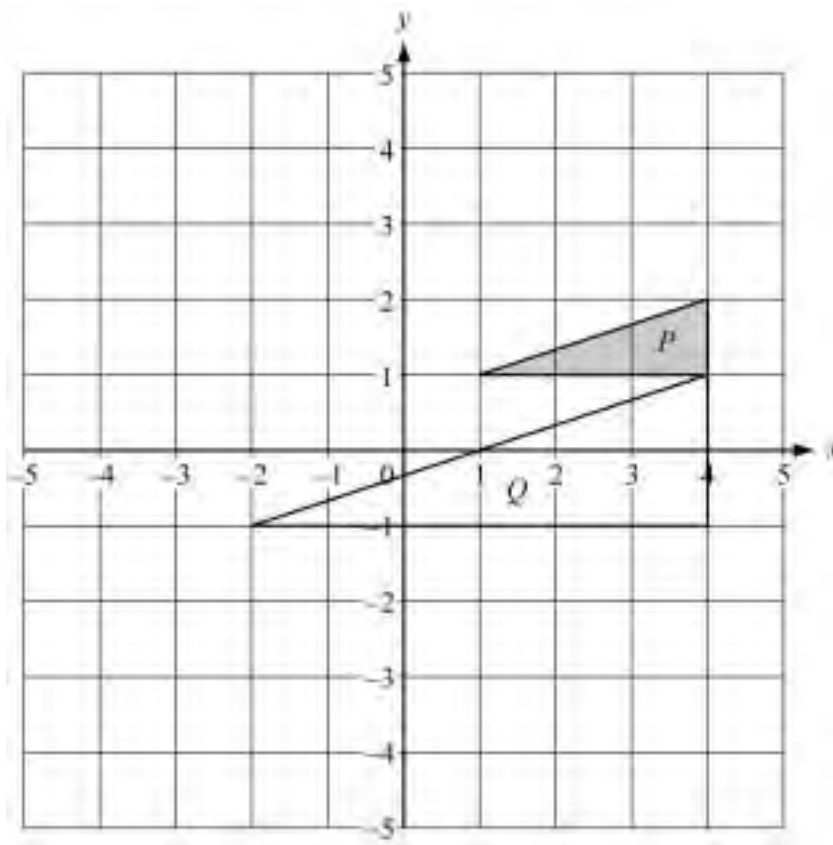
(a) Describe fully the **single** transformation, which maps triangle *P* onto triangle *Q*.

Answer(a) .... [3]

(b) Draw the image of triangle *P* after the translation $\begin{pmatrix} 1 \\ -5 \end{pmatrix}$. [2]

(c) Draw the image of triangle *P* after reflection in the *y*-axis. [2]

2 Louis and Chris go to the cinema.

(a) They go from home to the cinema by bus.
The bus departs at 16 47 and takes 25 minutes to reach the cinema.
Write down the time the bus arrives at the cinema.

Answer(a) .... [1]

(b) The adult bus fare is $1.20.

(i) Louis pays this fare but Chris pays 60% of the adult fare.
Calculate how much Chris pays.

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

(ii) Write down, in its simplest form, the ratio

Louis's fare : Chris's fare.
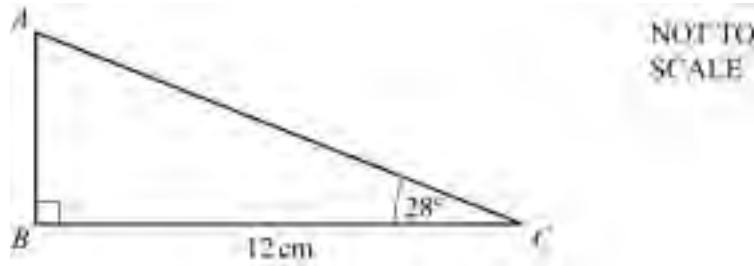
Answer(b)(ii) .... : .... [2]

(c) The cinema tickets usually cost $3.00 each.
Louis and Chris pay $2.55 each.
Calculate the reduction as a percentage of the usual cost.

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

(d) After the cinema, Louis and Chris go to a café.
They spend money in the ratio   Louis : Chris = 6 : 7.
Chris spends $2.10.
Calculate how much Louis spends.

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

3 (a)

NOT TO SCALE

In triangle *ABC*, *BC* = 12 cm and angle *ACB* = 28°.
Calculate

(i) the length of *AB*,

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

(ii) the area of triangle *ABC*.

Answer(a)(ii) .... cm² [2]

(b)

NOT TO SCALE
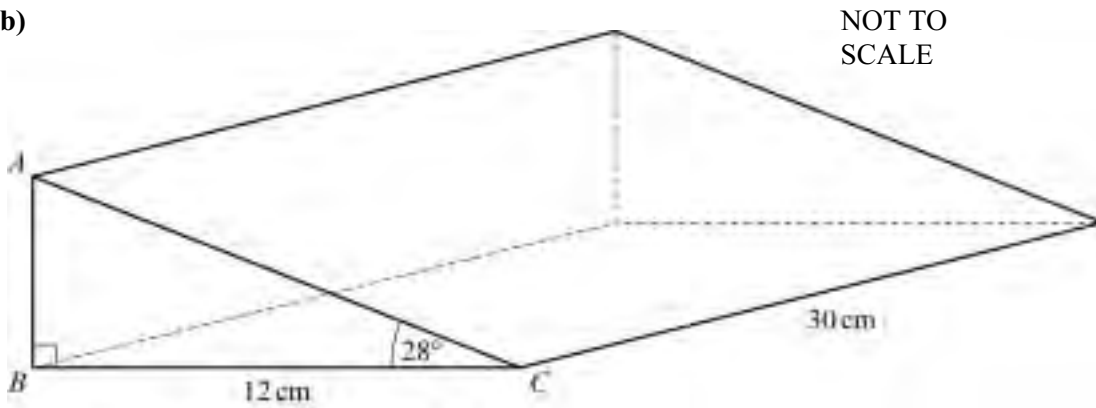
Triangle *ABC* in **part (a)** is the cross-section of the triangular prism shown in the diagram.
The length of the prism is 30 cm.
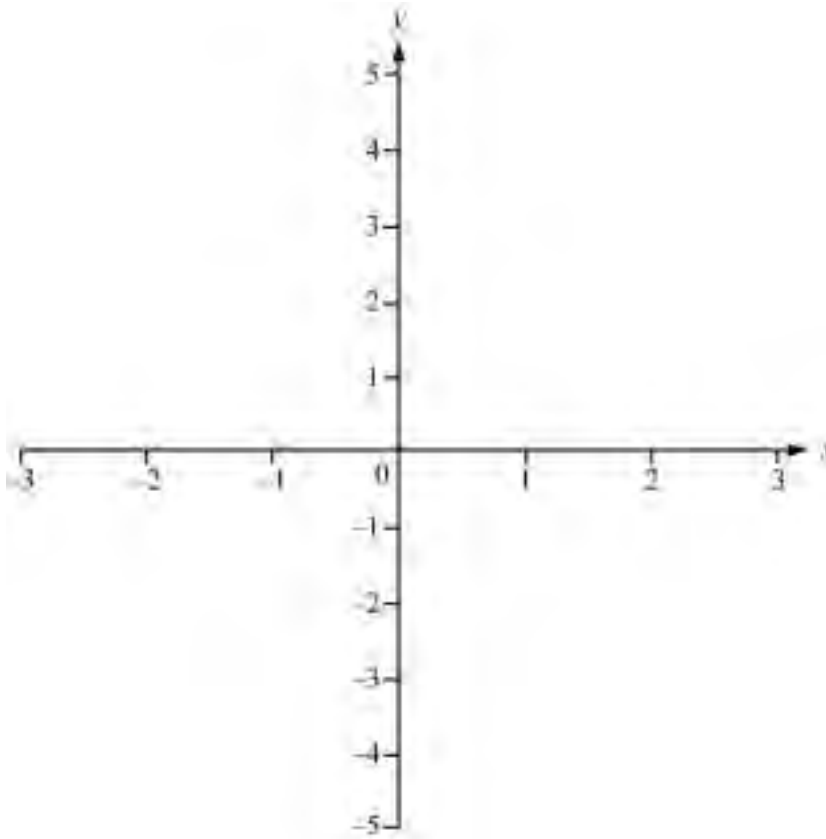Calculate

(i) the volume of the prism,

Answer(b)(i) .... cm³ [2]

(ii) the length of *AC*,

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

(iii) the **total** surface area of the prism.

Answer(b)(iii) .... cm² [3]

4 **(a)** On the grid provided, sketch the graph of $y = x^2 - \dfrac{1}{x}$ for $-3 \le x \le 3$, $x \ne 0$.

[4]

(b) Write down the co-ordinates of the point where the graph crosses the x-axis.

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

(c) Find the co-ordinates of the minimum point.

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

(d) Write down the equation of the asymptote of the graph.

Answer(d) .... [1]

(e) On the **same** grid, sketch the graph of $y = 4 - x^2$ for $-3 \le x \le 3$. [2]

(f) Write down the co-ordinates of one of the points of intersection of the two graphs.
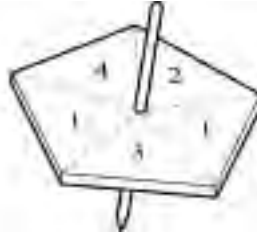
Answer(f) (............... , ...) [2]

(g) Solve the equation $x^2 - \dfrac{1}{x} = 4 - x^2$.

Answer(g) x = ... or .... or .... [3]

5

NOT TO
SCALE

The diagram shows a spinner, which gives scores of 1, 1, 2, 3 and 4.
The spinner is equally likely to stop on any of the five numbers.

(a) Write down the probability that the score is 1.

Answer(a) .... [1]

(b) The spinner is spun twice.

(i) Calculate the probability that the score is 1 both times.

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

(ii) Write down all the ways in which the two scores can give a total of 3.

Answer (b)(ii)

[2]

(iii) Calculate the probability that the total score is 3.

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

(c) David spins the spinner 10 times and his scores are

1, 1, 4, 2, 1, 1, 2, 1, 3, 3.

Find

(i) the mean,

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

(ii) the mode,

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

(iii) the median.

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

(d) Each student in David's class spins the spinner 10 times.
The results of the class are shown in the table.

Score	1	2	3	4
Frequency	107	40	56	17

Find

(i) the mean,

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

(ii) the mode,

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

(iii) the median,

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

(iv) the upper quartile,

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

(v) the range.

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

6

NOT TO
SCALE
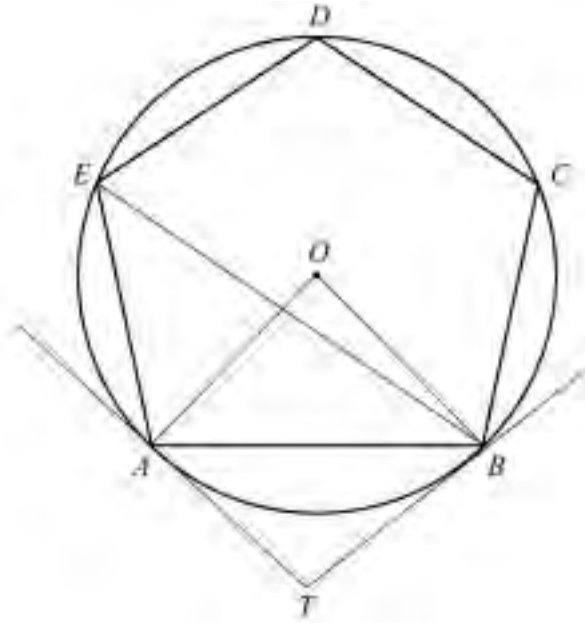
A, *B*, *C*, *D* and *E* are points on a circle, centre *O*.
ABCDE is a regular pentagon.

(a) Calculate

(i) angle *BCD*,

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

(ii) angle *AEB*,

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

(iii) angle *BED*,

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

(iv) angle *AOB*.

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

(b) Tangents are drawn at *A* and *B* and they meet at *T*.
Calculate angle *ATB*.

Answer(b) .... [2]

(c) Calculate angle *OBE*.

Answer(c) .... [2]

7   On 1 January 2004, Helena bought a car for $25 000.

At the end of each year, the value of the car is 10% less than its value at the start of that year.

(a) Calculate the value of the car on 1 January 2007.

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

(b) Calculate the total decrease in value, by 1 January 2007, as a percentage of the $25 000.

Answer(b) .... [3]

(c) Calculate the number of whole years it takes for the value of the car to go down from $25 000 to below $12 000.

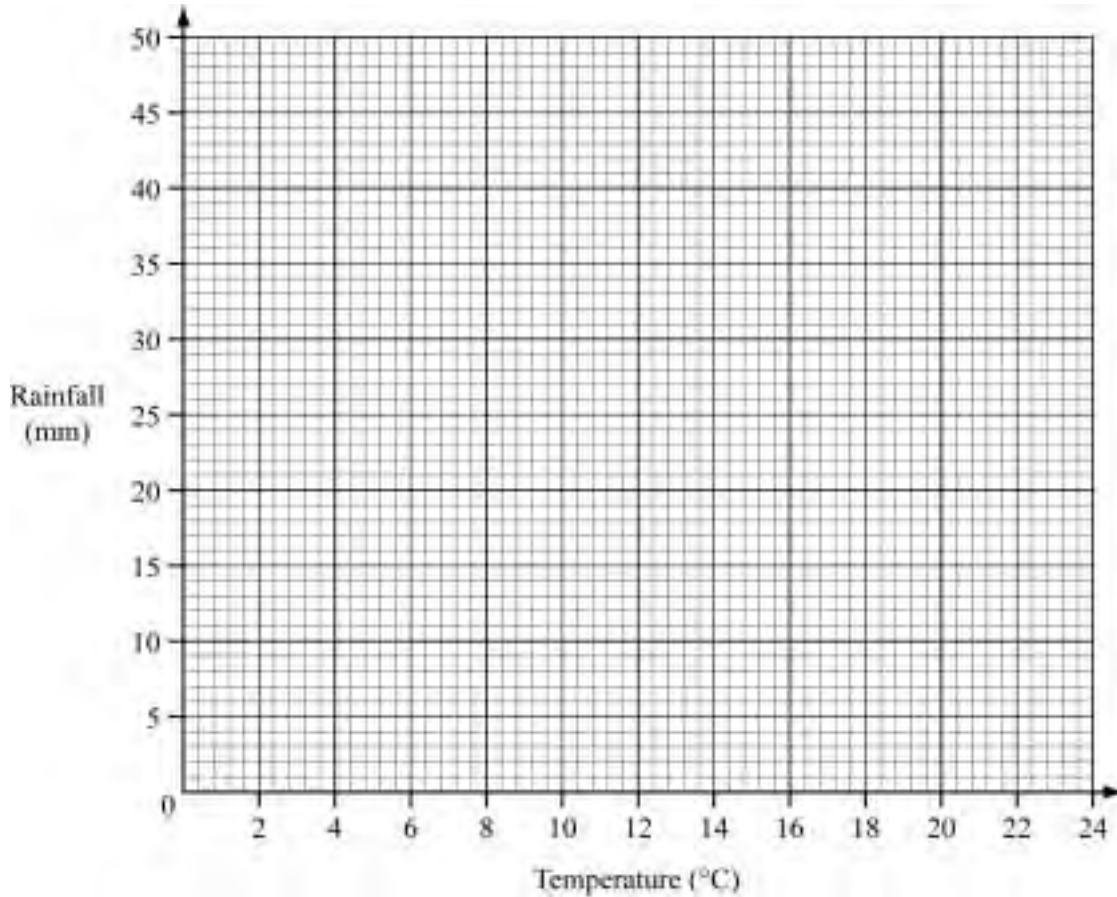*Answer(c)* .... [2]

       [Turn over

8   The monthly temperature and rainfall of a city are given in the table.

Month	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Temperature(°C)	8	7	9	11	15	20	23	23	21	16	12	9
Rainfall (mm)	45	50	40	40	32	15	18	21	15	25	32	41

(a) On the grid, draw an accurate scatter diagram.   [3]

(b) The mean of the 12 monthly temperatures is 14.5 °C.
The mean of the 12 monthly rainfalls is 31.2 mm.
Plot the point on the grid to show this information.   [1]

(c) Draw a line of best fit on your scatter diagram.   [2]

(d) In the following year, the June temperature is 18 °C.
Use your graph to find the expected June rainfall in the following year.

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

9   The area, *A*, of the curved surface of a cylinder of radius *r* and height *h* is given by the formula

$$A = 2\pi rh.$$

(a) Calculate the curved surface area of a cylinder of radius 4.7 cm and height 11.4 cm.

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

(b) Make *h* the subject of the formula $A = 2\pi rh$.

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

(c) Calculate the height of a cylinder that has a radius of 2.7 cm and a curved surface area of 90.3 cm^2.

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

10 (a) Sketch the graph of $y = x + \dfrac{1}{x}$ for $-4 \le x \le 4, x \ne 0$.
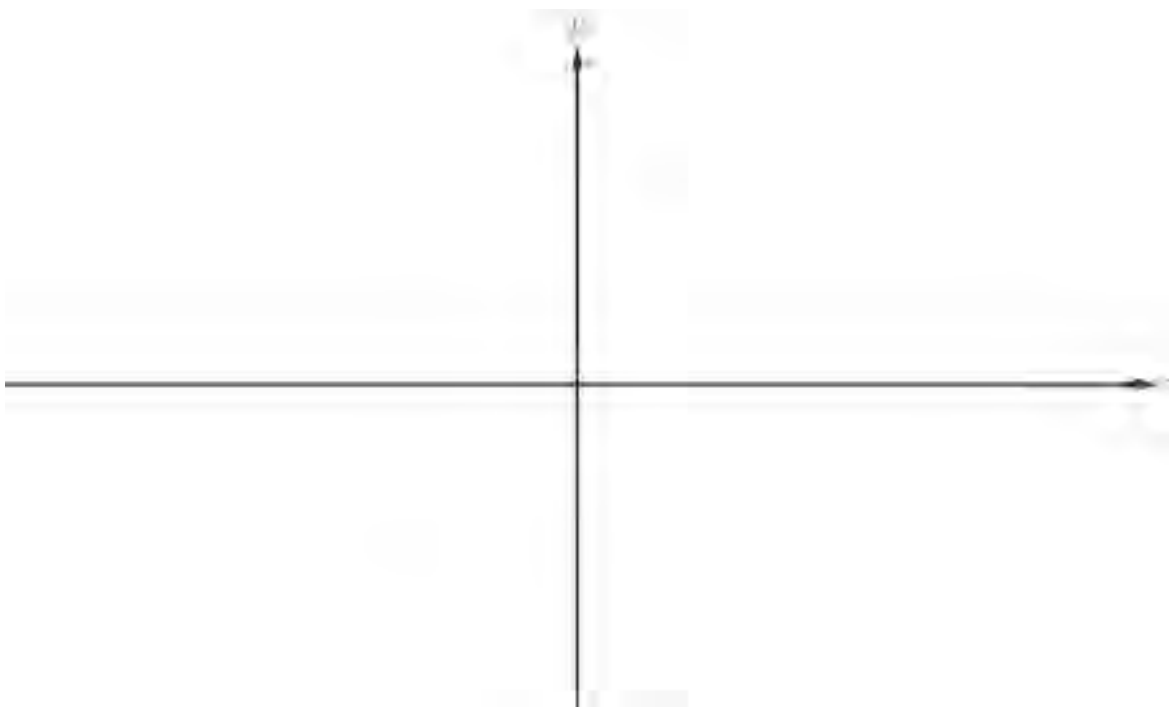
[2]

(b) The straight lines $y = mx$, where m is any real number, all go through the same point.

Write down the co-ordinates of this point.

Answer(b) .... [1]

(c) Find any value of m so that the graphs of $y = x + \dfrac{1}{x}$ and $y = mx$ intersect.

Answer(c) .... [1]

(d) Find any value of m so that the graphs of $y = x + \dfrac{1}{x}$ and $y = mx$ do not intersect.

Answer(d) .... [1]

(e) Complete the statement, by filling in the space.

Answer(e) The graphs $y = x + \dfrac{1}{x}$ and $y = mx$ intersect if $m >$

.... [1]

(f) On the graph of $y = x + \dfrac{1}{x}$, A is the point where $x = -2$ and B is the point where $x = 2$.

AB is the diagonal of a rectangle $APBQ$ in which the side AP is parallel to the x-axis.

(i) Draw the rectangle on your sketch. [1]

(ii) Calculate the area of the rectangle $APBQ$.

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

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