UNIVERSITY OF CAMBRIDGE INTERNATIONAL EXAMINATIONS
International General Certificate of Secondary Education

CANDIDATE NAME

CENTRE NUMBER | | | | | |

CANDIDATE NUMBER | | | | |

5760555781

CAMBRIDGE INTERNATIONAL MATHEMATICS **0607/03**

Paper 3 (Core) **May/June 2009**

1 hour 45 minutes

Candidates answer on the Question Paper

Additional Materials: Geometrical Instruments
Graphics Calculator

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.
DO **NOT** WRITE IN ANY BARCODES

Answer **all** the questions.
Unless instructed otherwise, give your answers exactly or correct 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 the relevant working to gain full marks and you will be given marks for correct methods, including sketches, 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 number of the marks for this paper is 96.

For Examiner's Use

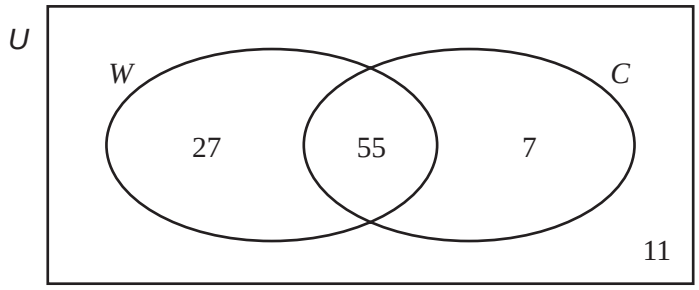
This document consists of **16** printed pages.

Formula List

Area, A, of triangle, base b, height h.	$A = \frac{1}{2}bh$
Area, A, of circle, radius r.	$A = \pi r^2$
Circumference, C, of circle, radius r.	$C = 2\pi r$
Curved surface area, A, of cylinder of radius r, height h.	$A = 2\pi rh$
Curved surface area, A, of cone of radius r, sloping edge l.	$A = \pi rl$
Curved surface area, A, of sphere of radius r.	$A = 4\pi r^2$
Volume, V, of prism, cross-sectional area A, length l.	$V = Al$
Volume, V, of pyramid, base area A, height h.	$V = \frac{1}{3}Ah$
Volume, V, of cylinder of radius r, height h.	$V = \pi r^2 h$
Volume, V, of cone of radius r, height h.	$V = \frac{1}{3}\pi r^2 h$
Volume, V, of sphere of radius r.	$V = \frac{4}{3}\pi r^3$

Answer **all** the questions.

1



100 students are asked if they walk (W) or cycle (C) as part of their regular exercise.

The Venn diagram shows this information.

(a) How many students

(i) walk **and** cycle,

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

(ii) cycle but do not walk,

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

(iii) do not walk **and** do not cycle?

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

(b) Write down the value of

(i) n(W),

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

(ii) n(C').

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

(c) One of the students is chosen at random.
Find the probability that this student does at least one of these types of exercise.

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

(d) A school has 2000 students.
Use your results to predict the number of students from the school who do at least one of these types of exercise.

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

2 Konrad keeps a record of the marks he receives in ten tests.

Mark	7	8	9	10
Frequency	5	2	2	1

(a) Find

(i) the mode,

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

(ii) the median,

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

(iii) the mean,

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

(iv) the range,

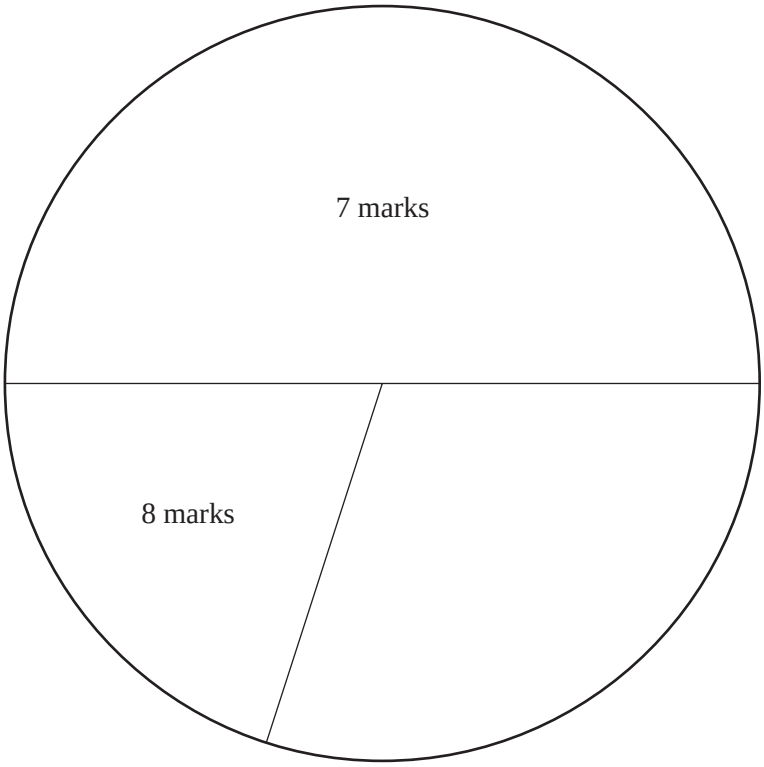
Answer (a)(iv) ..... [1]

(v) the upper quartile.

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

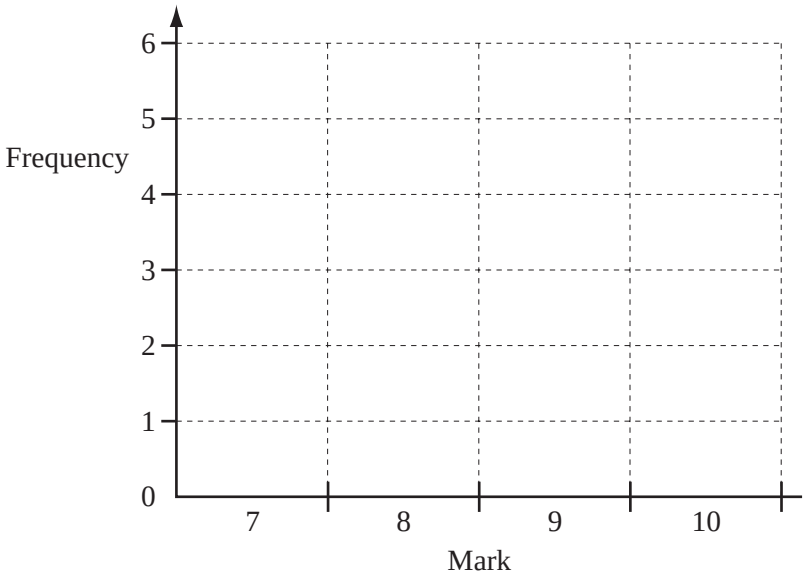
(b) A pie chart to show this information has been started below.

Complete and label the pie chart **accurately**.



[2]

(c)



On the grid above, draw a bar chart to show Konrad's marks. [3]

(d) Work out the percentage of the ten tests in which Konrad's marks were 9 or 10.

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

3 **(a)** The ratio of Abdul's height to Babar's height is

Abdul : Babar = 6 : 5

Abdul's height is 180 cm.

Calculate Babar's height.

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

(b) The masses of Abdul and Babar are in the same ratio as their heights.

The total of their masses is 121 kg.

Show that Abdul's mass is 66 kg.

[2]

(c) Last year Abdul's mass was 63 kg.

It is now 66 kg.

Calculate the percentage increase in Abdul's mass.

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

(d) Convert 63 kg into grams.
Give your answer in standard form.

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

(e) Abdul and Babar run 100 metres.

(i) Abdul runs at a steady speed of 7 metres per second.

Find the time taken for Abdul to run the 100 metres.

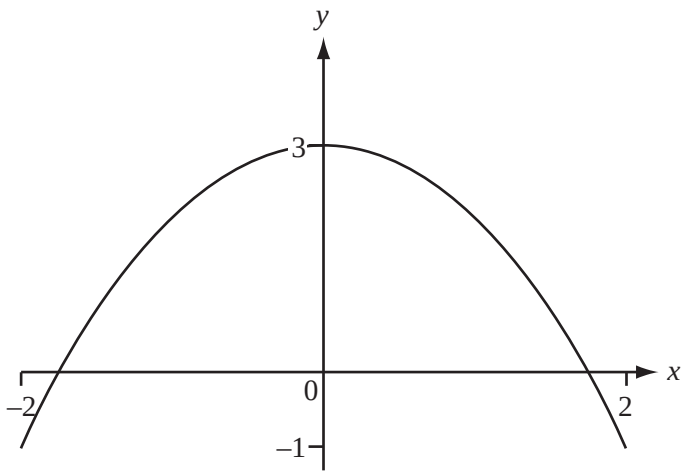
Answer (e)(i) ..... seconds [2]

(ii) Babar takes 14.5 seconds to run the 100 metres.

Find his speed, in metres per second.

Answer (e)(ii) ..... m/s [2]

4



The diagram shows a sketch of the graph of the function $y = 3 - x^2$.

(a) On the diagram, sketch the graph of the function $y = \frac{x}{2} + 2$ for $-2 \leqslant x \leqslant 2$. [2]

(b) Solve the equation $3 - x^2 = \frac{x}{2} + 2$.

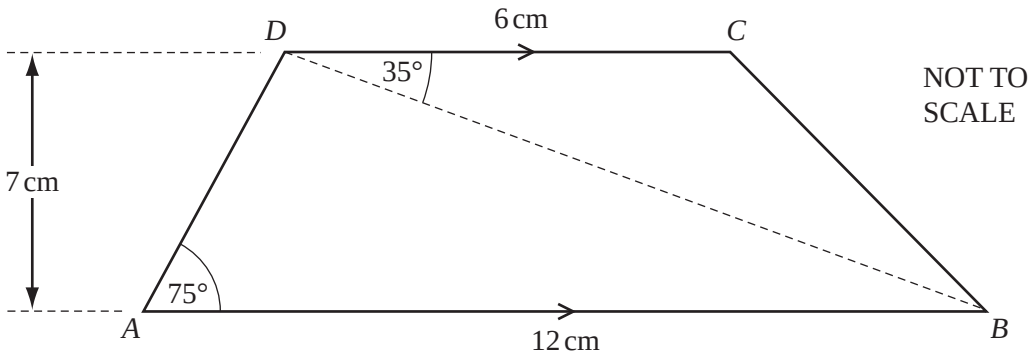
Give your answers correct to 4 decimal places.

Answer (b) $x =$ ..... or ..... [2]

(c) On the diagram, sketch the straight line $y = 4$.

From your diagram, explain why the equation $3 - x^2 = 4$ has **no** solutions. [1]

5



ABCD is a trapezium with *AB* parallel to *DC*.

AB = 12 cm, *DC* = 6 cm and the height of the trapezium is 7 cm.

Angle *DAB* = 75° and angle *CDB* = 35°.

Calculate

(a) the area of triangle *ABD*,

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

(b) the area of the trapezium,

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

(c) angle *ADC*,

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

(d) angle *ABD*.

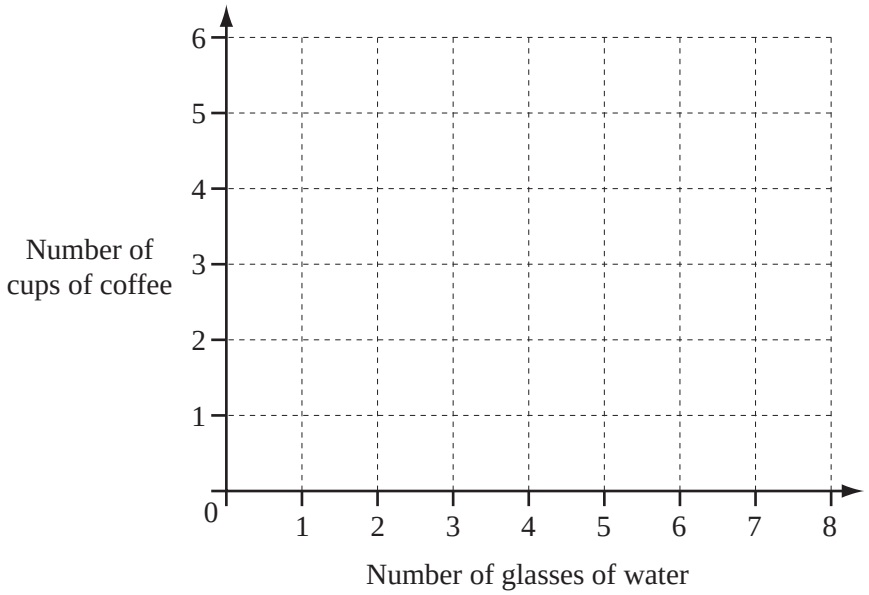
Answer (d) ..... [1]

6 Each day Lavinia records the number of glasses of water and the number of cups of co drinks.

The results for one week are shown in the table.

Day	Sun	Mon	Tue	Wed	Thu	Fri	Sat
Number of glasses of water	8	5	6	3	7	7	6
Number of cups of coffee	2	4	4	6	2	1	2

(a) On the grid, draw a scatter diagram to show this information.



[3]

(b) Which of these words (**positive, negative, none**) describes the correlation between the number of glasses of water and the number of cups of coffee?

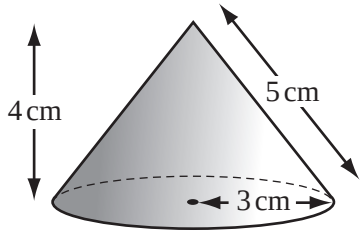
Answer (b) ..... [1]

(c) **(i)** Calculate the mean number of cups of coffee.

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

(ii) The mean number of glasses of water is 6.
Draw the line of best fit for this data. [2]

7



NOT TO SCALE

The diagram shows a solid cone of height 4 cm and radius 3 cm.
The length of the sloping edge of the cone is 5 cm.

(a) (i) Calculate the volume of the cone.

Answer (a) (i) ..... cm^3 [2]

(ii) The cone is made of metal.
$1\ cm^3$ of the metal has a mass of 7.5 g.

Calculate the mass of the cone.

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

(b) (i) Calculate the **total** surface area of the cone.

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

(ii) Change your answer into square metres.

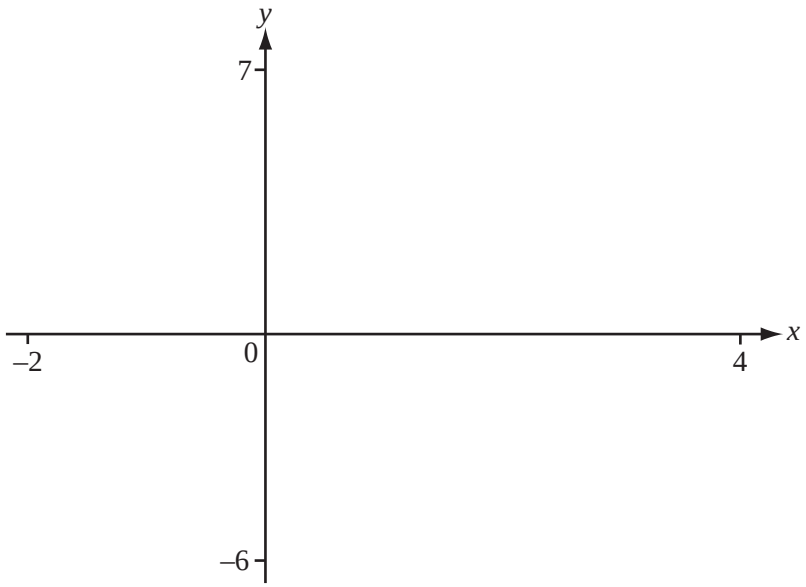
Answer (b) (ii) ..... m^2 [1]

(iii) One pot of paint covers $7\ m^2$.

How many of these cones can be painted using one pot of paint?

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

8



(a) On the diagram, sketch the graph of the function $y = \frac{x^3}{3} - x^2 + 1$ for $-2 \leqslant x \leqslant 4$. [4]

(b) Find the value of y when

(i) $x = 0$ *Answer (b)(i)* ..... [1]

(ii) $x = 3.5$ *Answer (b)(ii)* ..... [1]

(c) Find the three values of x when $y = 0$.

Answer (c) $x =$ ..... , ... , ... [3]

(d) Find the co-ordinates of the local minimum point.

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

(e) Find the value of x when $\frac{x^3}{3} - x^2 + 1 = -2$

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

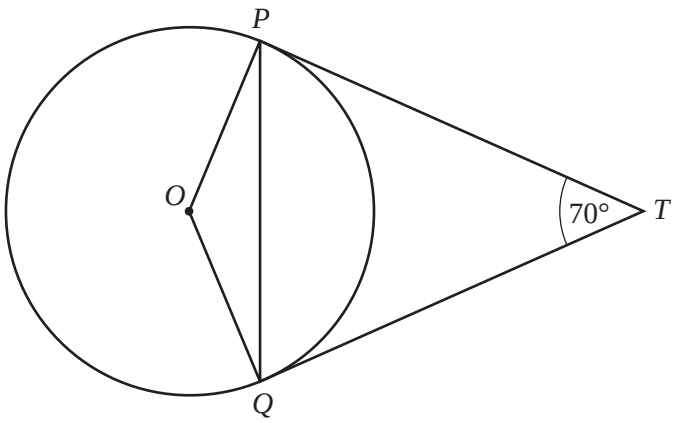
(f) The domain of the function $f(x) = \frac{x^3}{3} - x^2 + 1$ is $-2 \leqslant x \leqslant 4$.

Find the range of the function.

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

9

NOT TO SCALE



The diagram shows a circle, centre O.

TP and TQ are tangents to the circle at P and Q.

Angle $PTQ = 70°$.

(a) Calculate

(i) angle TPQ,

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

(ii) angle POQ.

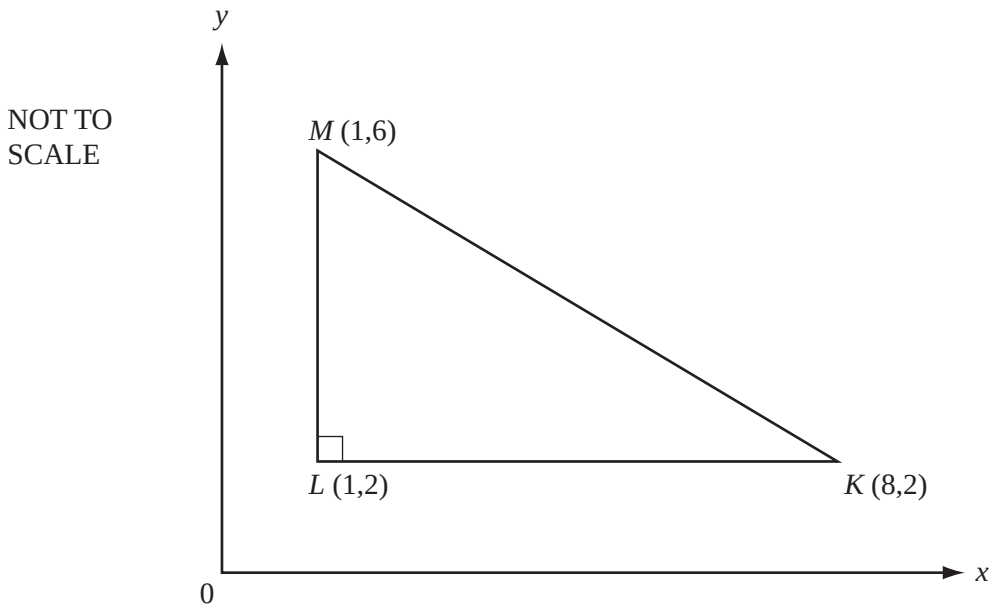
Answer (a)(ii) ..... [2]

(b) Another circle can be drawn through the points O, P, T and Q.

Complete the statement.

"OT is a ..... of this new circle." [1]

10



The diagram shows triangle *KLM* on a co-ordinate grid.

The diagram is not to scale so do not measure any lengths or angles.

(a) Write down the equation of the straight line which passes through *L* and *M*.

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

(b) Find the gradient of the line *MK*.

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

(c) Find the co-ordinates of the midpoint of the line *MK*.

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

(d) Calculate the length of *MK*.

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

(e) Use trigonometry to calculate the size of angle *LKM*.

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

Question 11 is printed on the next page.

11 **(a)** Find the value of $\frac{2x}{5} - \frac{y}{2}$ when $x = 7$ and $y = 4$.

Give your answer as a fraction in its lowest terms.

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

(b) $\frac{2x}{5} - \frac{y}{2}$ can be written as a single fraction $\frac{\square x - \square y}{10}$.

Fill in the two missing values.

[2]

(c) $\frac{2x}{5} - \frac{y}{2} = 1$ and $y = 14$.

Find the value of x.

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

(d) $\frac{2x}{5} - \frac{y}{2} = 1$.

Find y in terms of x.

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