Cambridge IGCSE

Cambridge International Examinations
Cambridge International General Certificate of Secondary Education

CANDIDATE NAME	
CENTRE NUMBER	
CANDIDATE NUMBER	

2134418509

CAMBRIDGE INTERNATIONAL MATHEMATICS **0607/43**

Paper 4 (Extended) **October/November 2017**

2 hours 15 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, glue or correction fluid.
You may use an HB 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 marks for this paper is 120.

This document consists of **19** printed pages and **1** blank page.

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[Turn over

Formula List

For the equation $ax^2 + bx + c = 0$ $\quad x = \dfrac{-b \pm \sqrt{b^2 - 4ac}}{2a}$

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

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

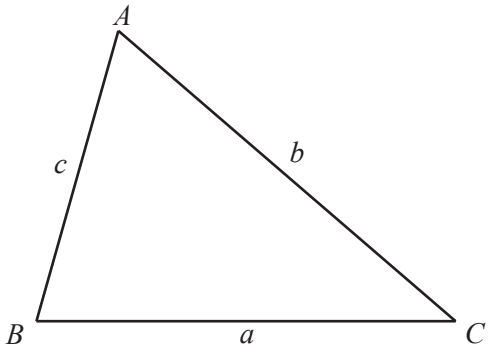
Curved surface area, A, of sphere of radius r. $\quad A = 4\pi r^2$

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

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

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

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



$$\frac{a}{\sin A} = \frac{b}{\sin B} = \frac{c}{\sin C}$$

$$a^2 = b^2 + c^2 - 2bc\cos A$$

$$\text{Area} = \frac{1}{2}bc\sin A$$

Answer **all** the questions.

1 $f(x) = 3x - 2$ $g(x) = \frac{1}{x},\ x \neq 0$ $h(x) = (x+2)^2$

(a) Find

(i) f(4),

..... [1]

(ii) gf(4).

..... [1]

(b) Find g(g(5)).

..... [2]

(c) Solve f(h(x)) = 10.

x = ... or x = ... [3]

(d) Find g(h(f(x))) in terms of x.

..... [2]

2 Alan, Brendan and Cieran work as gardeners.

(a) The total amount of money they earn is shared in the ratio of the time each person works.
One day Alan works for 2 hours 40 minutes, Brendan works for 5.5 hours and Cieran works for 200 minutes.
They earn, in total, $379.50 .

By changing all the times into minutes, find the amount of money each person earns.

Alan $ .....

Brendan $ .....

Cieran $ .....
[5]

(b) **(i)** Alan needs to buy some gardening tools.
In shop A, the price of the tools is $70.20 .
In shop B, the price of the tools is 5% less than in shop A.

Find the price of the tools in shop B.

$ ..... [2]

(ii) The price of $70.20 is 8% higher than it was last year.

Find the price last year.

$ ..... [3]

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(c) (i) Brendan invests \$450 for 5 years at a rate of 3.5% per year simple interest.

Show that the total value of this investment after 5 years is \$528.75 .

[2]

(ii) Cieran invests \$450 for 5 years at a rate of x % compound interest.
The value of Cieran's investment after 5 years is \$530.60 .

Find the value of x.

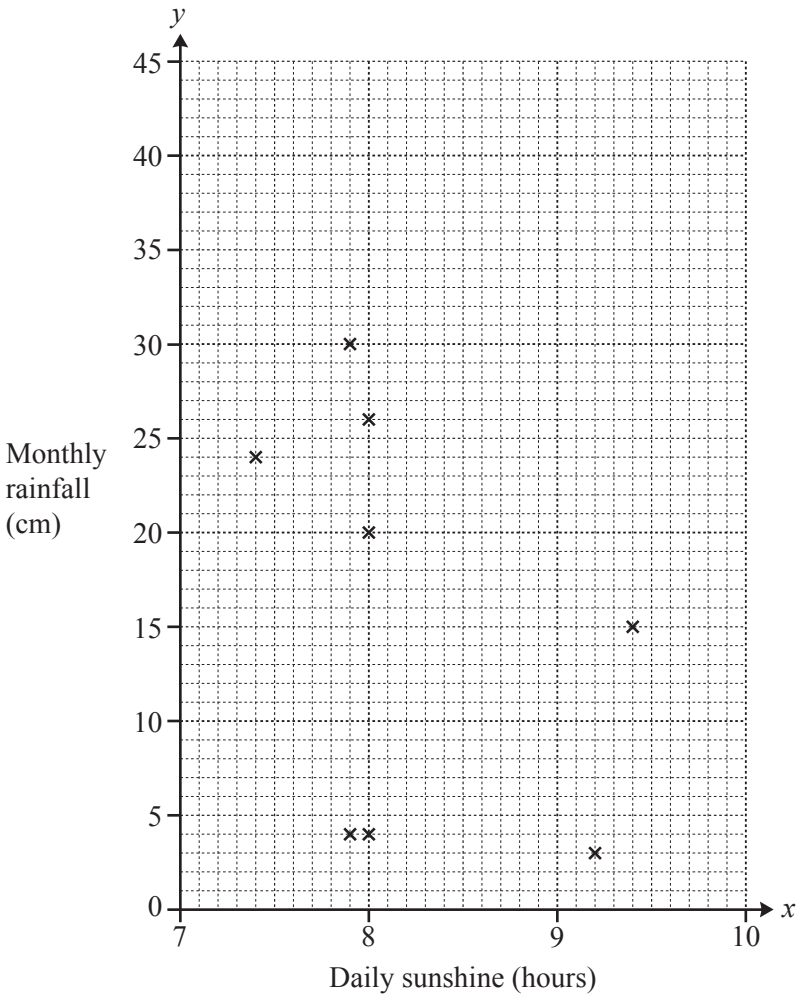
$x =$ ..... [3]

3 Pepe wants to find out if there is a correlation between the hours of sunshine, x hours, and the rainfall, y cm, in Phuket.

Pepe recorded the following results.

Month	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Daily sunshine (x hours)	8	9.2	7.9	9.4	8	7.4	7.9	8	7.3	7.4	7.5	8
Monthly rainfall (y cm)	4	3	4	15	20	24	30	26	40	28	20	6

(a) (i) Complete the scatter diagram.
The first eight points have been plotted for you.



[2]

(ii) What type of correlation is shown by the scatter diagram?

..... [1]

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(b) (i) Find the mean number of hours of sunshine.

..... hours [1]

(ii) Find the mean rainfall.

..... cm [1]

(c) (i) Find the equation of the regression line for y in terms of x.

$y =$ ..... [2]

(ii) Estimate the rainfall when the number of hours of sunshine is 7.7 .

..... cm [1]

4 The masses of 120 peaches are recorded in the table.

Mass (m grams)	Frequency
$0 < m \leqslant 120$	12
$120 < m \leqslant 150$	27
$150 < m \leqslant 180$	33
$180 < m \leqslant 210$	15
$210 < m \leqslant 250$	28
$250 < m \leqslant 300$	5

(a) Calculate an estimate of the mean mass of a peach.
Give your answer correct to the nearest gram.

..... g [3]

(b) Two peaches are chosen at random.

Find the probability that they both have a mass of more than 210 g.
Give your answer as a fraction in its simplest form.

..... [3]

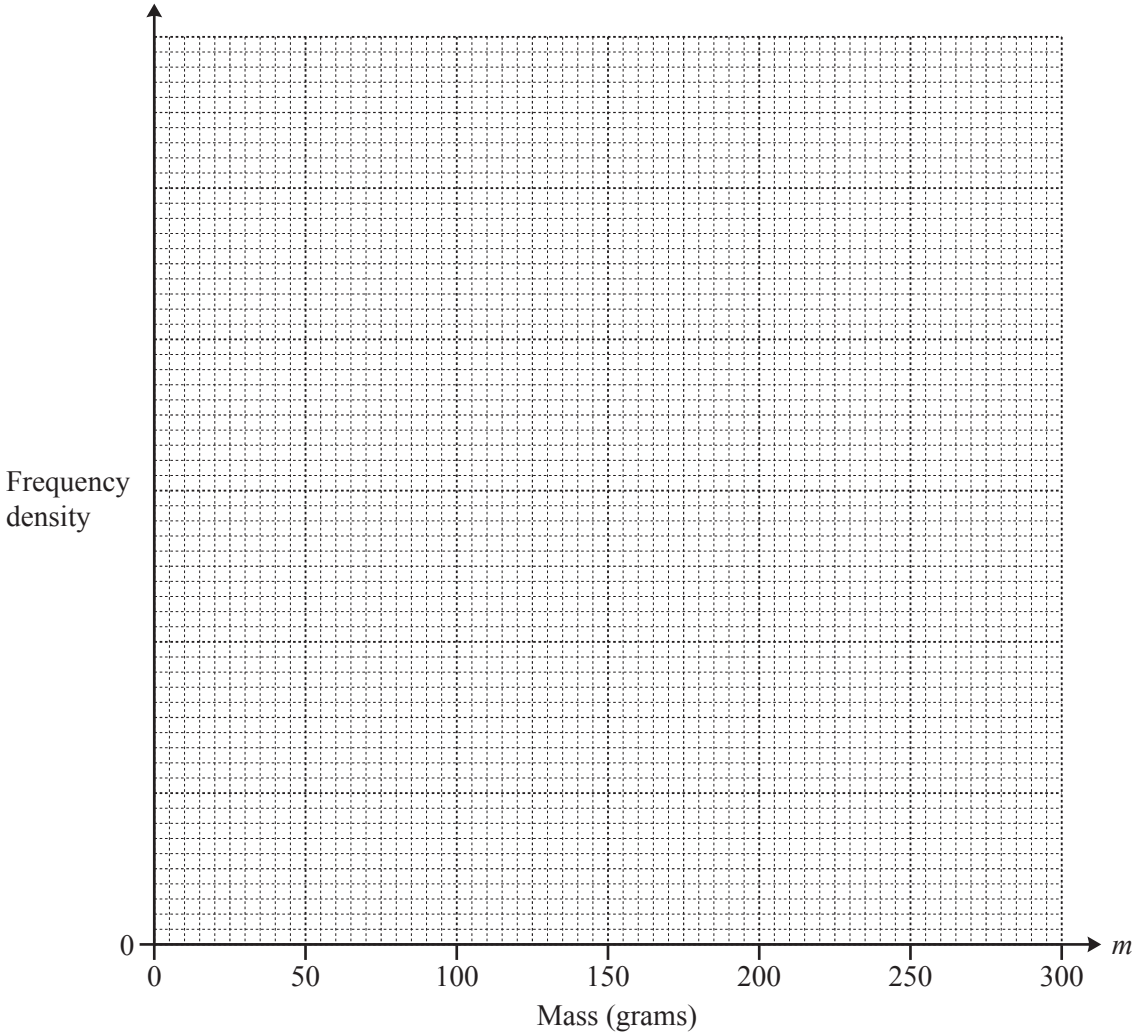
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(c) **(i)** Complete the frequency density column in this table.

Mass (m grams)	Frequency	Frequency density
$0 < m \leqslant 120$	12	
$120 < m \leqslant 150$	27	
$150 < m \leqslant 180$	33	
$180 < m \leqslant 210$	15	
$210 < m \leqslant 250$	28	
$250 < m \leqslant 300$	5	0.1

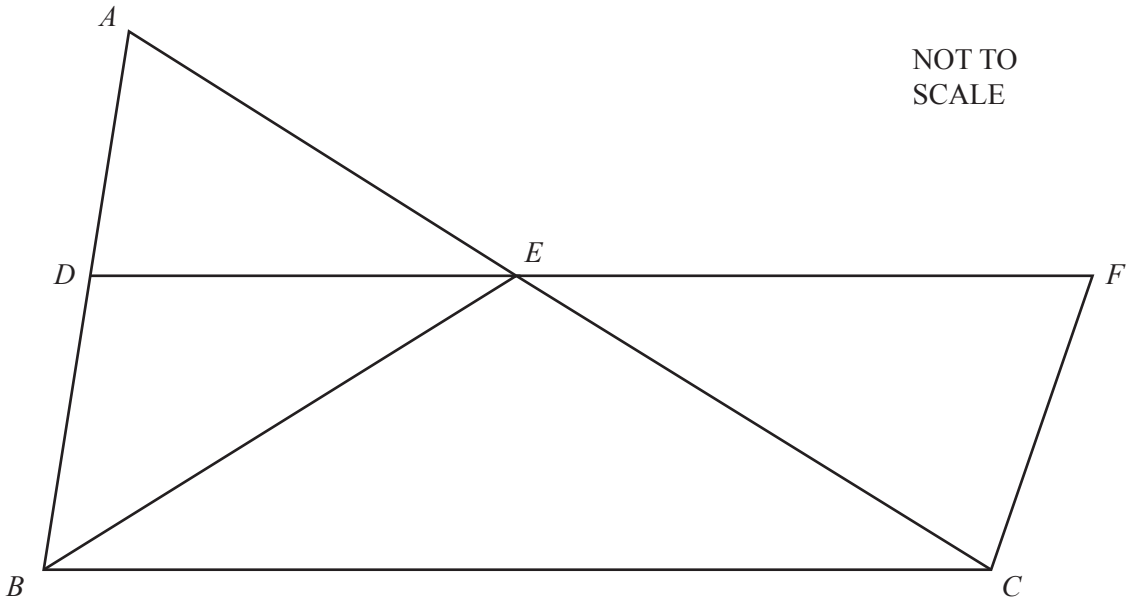
[2]

(ii) On the grid, draw an accurate histogram to show this information.



[4]

5



ABC is a triangle and $BCFD$ is a parallelogram.

$AD = \frac{1}{3}AB$ and $AE = \frac{1}{3}AC$.

$\overrightarrow{AB} = 6\mathbf{p}$ and $\overrightarrow{AC} = 6\mathbf{q}$.

(a) Find an expression, in terms of **p** and/or **q**, for

(i) $\overrightarrow{BC}$,

..... [1]

(ii) $\overrightarrow{DE}$,

..... [2]

(iii) $\overrightarrow{FC}$,

..... [1]

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(iv) $\overrightarrow{BE}$.

..... [2]

(b) The area of triangle ADE is 24 units^2.

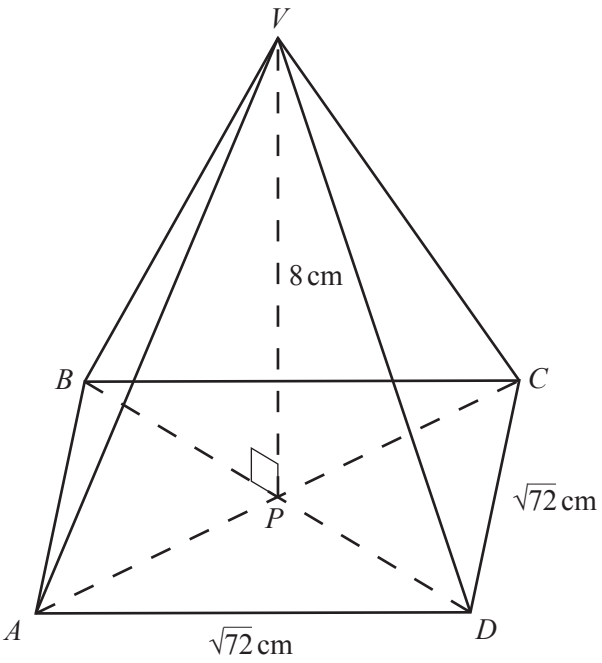
(i) Find the area of triangle ABC.

..... units^2 [2]

(ii) Find the area of triangle EFC.

..... units^2 [3]

6



NOT TO SCALE

The diagram shows a pyramid with a square base $ABCD$ of side $\sqrt{72}$ cm.
The diagonals of the base, AC and BD, meet at P.
The vertex, V, is vertically above P and $VP = 8$ cm.

(a) Find the volume of the pyramid.
Give the units of your answer.

.... [3]

(b) Find the length AC.

$AC =$ ..... cm [2]

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(c) Find the length DV.

$DV =$ ..... cm [3]

(d) Find angle VDP.

Angle $VDP =$ ..... [2]

(e) X is the midpoint of the side CD.

(i) Find the length VX.

$VX =$ ..... cm [3]

(ii) Find angle VXP.

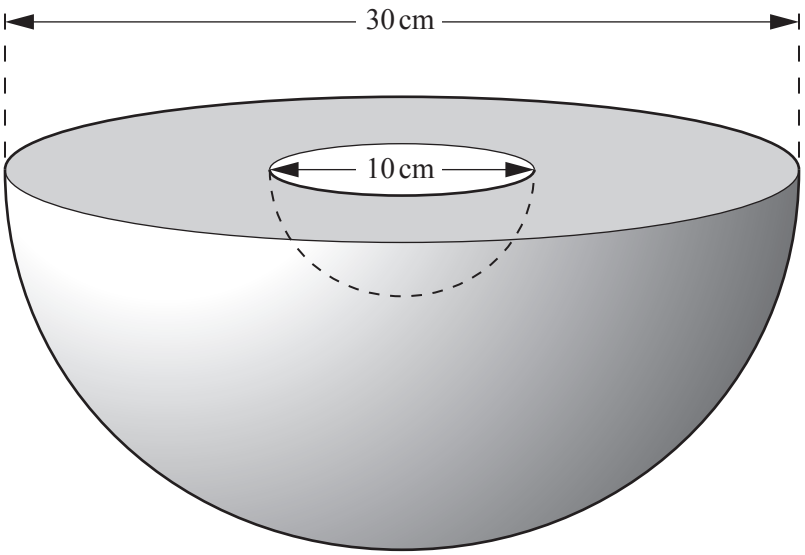
Angle $VXP =$ ..... [2]

(f) The pyramid is cut parallel to $ABCD$ to form a smaller pyramid $VEFGH$.
The volume of $VEFGH$ is $24\,\text{cm}^3$.

Find the vertical height of this pyramid.

..... cm [3]

7



The diagram shows a hollow metal hemisphere.
The outside diameter of the hemisphere is 30 cm and the inside diameter is 10 cm.

(a) Find the volume of metal used to make the hemisphere.

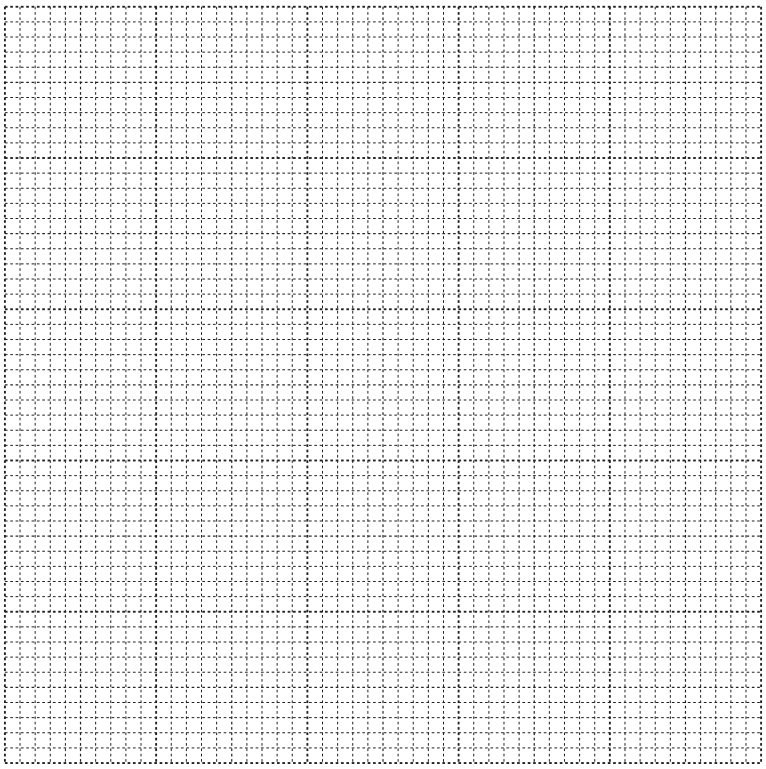
..... cm^3 [3]

(b) Find the total surface area of the hemisphere.

..... cm^2 [5]

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8 You may use the grid to help you in answering this question.



The transformation P is a rotation through 90° anti-clockwise about the origin.
The transformation Q is a reflection in the line $y = -x$.

(a) Find the image of the point (5, 1) under the transformation P.

(..... , ...) [2]

(b) Find the image of the point (5, 1) under the transformation Q.

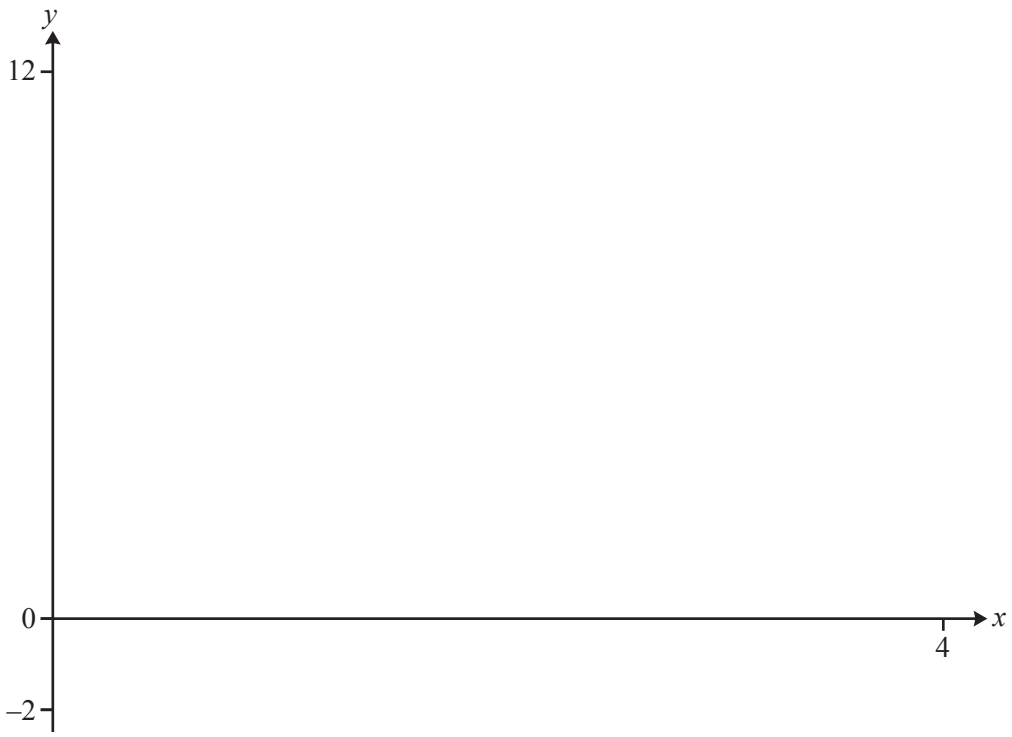
(..... , ...) [2]

(c) Describe fully the **single** transformation equivalent to the transformation P followed by the transformation Q.

.....

..... [2]

9



$f(x) = 10 + x - x^2$ for $0 \leqslant x \leqslant 4$

(a) (i) On the diagram, sketch the graph of $y = f(x)$. [2]

(ii) Write down the co-ordinates of the points where the graph crosses the axes.

(..... , ...) or (..... , ...) [2]

(iii) Solve $f(x) = 1$.

$x =$ ..... [1]

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(b) $g(x) = x^2 - 10\log x$

(i) On the same diagram, sketch the graph of $y = g(x)$, for $0 < x \leqslant 4$. [2]

(ii) Write down the co-ordinates of the minimum point of $g(x)$.

(..... , ...) [2]

(iii) Solve the equation.

$$f(x) = g(x)$$

..... [2]

(iv) Solve the equation.

$$f(x - 1) = g(x - 1)$$

..... [2]

10 **(a)** Solve the equation $4x^2 = 12 - 3x$.

Give your answers correct to 2 decimal places.
You must show all your working.

$x =$ ..... or $x =$ ..... [4]

(b) Solve the inequality $4x^2 > 12 - 3x$.

..... [2]

(c) Solve the inequality $4x^2 + 5 \leqslant 12 - 3x$.

..... [4]

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11 **(a)** Solve the simultaneous equations.
You must show all your working.

$$3x - 2y = 11$$
$$4x - 5y = 10$$

$x =$ .....

$y =$ ..... [4]

(b) Use your answers to **part (a)** to solve the simultaneous equations.

$$3a - 2b = 22$$
$$4a - 5b = 20$$

$a =$ .....

$b =$ ..... [2]

(c) **(i)** Use your answers to **part (a)** to find the exact answers to these simultaneous equations.

$$3 \times 10^p - 2 \times 10^q = 11$$
$$4 \times 10^p - 5 \times 10^q = 10$$

$p =$ .....

$q =$ ..... [3]

(ii) Find the value of $p + q$.

..... [1]

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