



# Cambridge IGCSE™

CANDIDATE  
NAME

CENTRE  
NUMBER

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NUMBER

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**CAMBRIDGE INTERNATIONAL MATHEMATICS**

**0607/42**

Paper 4 (Extended)

**May/June 2020**

**2 hours 15 minutes**

You must answer on the question paper.

You will need: Geometrical instruments

## INSTRUCTIONS

- Answer **all** questions.
- Use a black or dark blue pen. You may use an HB pencil for any diagrams or graphs.
- Write your name, centre number and candidate number in the boxes at the top of the page.
- Write your answer to each question in the space provided.
- Do **not** use an erasable pen or correction fluid.
- Do **not** write on any bar codes.
- You should use a graphic display calculator where appropriate.
- You may use tracing paper.
- You must show all necessary working clearly and you will be given marks for correct methods, including sketches, even if your answer is incorrect.
- Give non-exact numerical answers correct to 3 significant figures, or 1 decimal place for angles in degrees, unless a different level of accuracy is specified in the question.
- For  $\pi$ , use your calculator value.

## INFORMATION

- The total mark for this paper is 120.
- The number of marks for each question or part question is shown in brackets [ ].

This document has **20** pages. Blank pages are indicated.

## Formula List

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

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  $l$ .  $A = \pi rl$

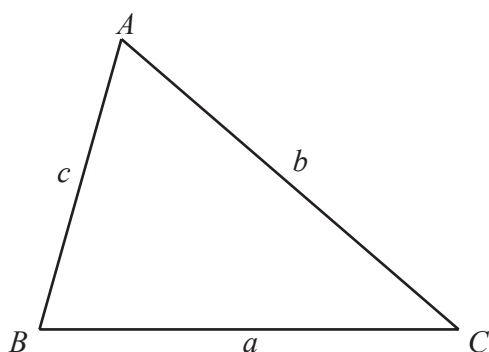
Curved surface area,  $A$ , of sphere of radius  $r$ .  $A = 4\pi r^2$

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



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

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

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

Answer **all** the questions.

- 1 A class of 40 students complete a science test.  
The table shows the marks of the 40 students.

Mark	0	1	2	3	4	5	6	7	8	9	10
Number of students	1	1	2	5	5	5	6	3	9	2	1

- (a) Write down the mode.

..... [1]

- (b) Work out the range.

..... [1]

- (c) Find the median.

..... [1]

- (d) Find the interquartile range.

..... [2]

- (e) Calculate the mean.

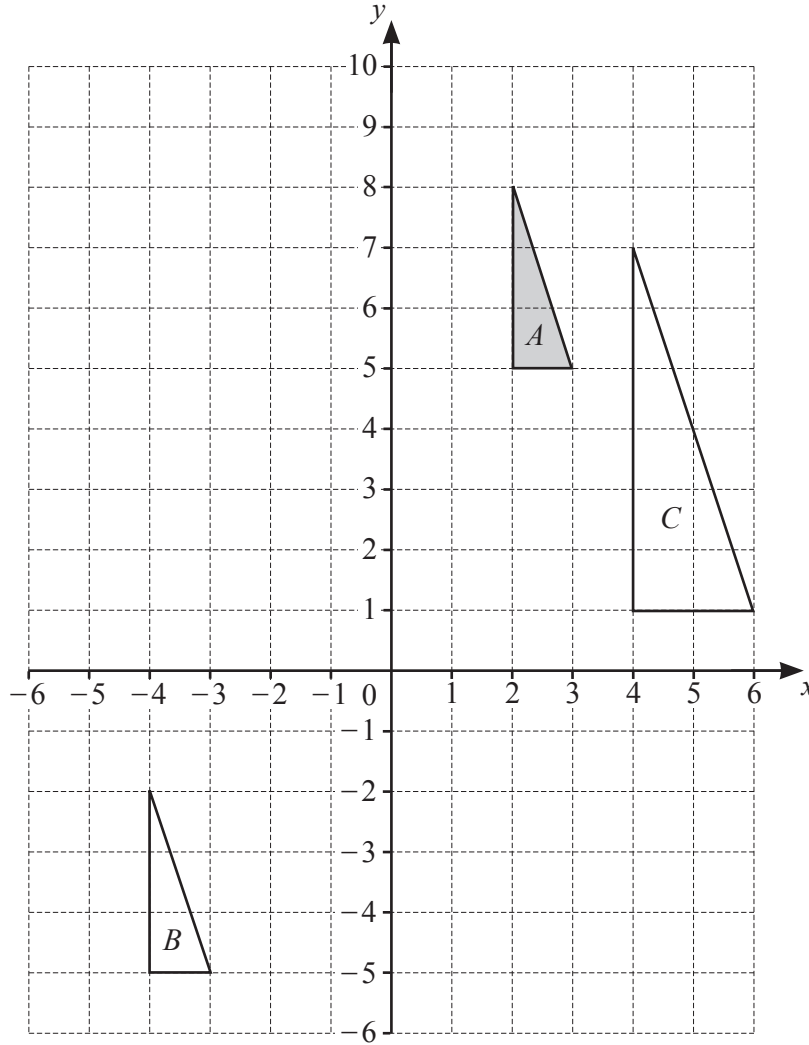
..... [2]

- (f) Two of the students are chosen at random.

Find the probability that the difference in their marks is 8.

..... [3]

2 (a)



(i) Describe fully the **single** transformation that maps triangle *A* onto triangle *B*.

.....  
 .....

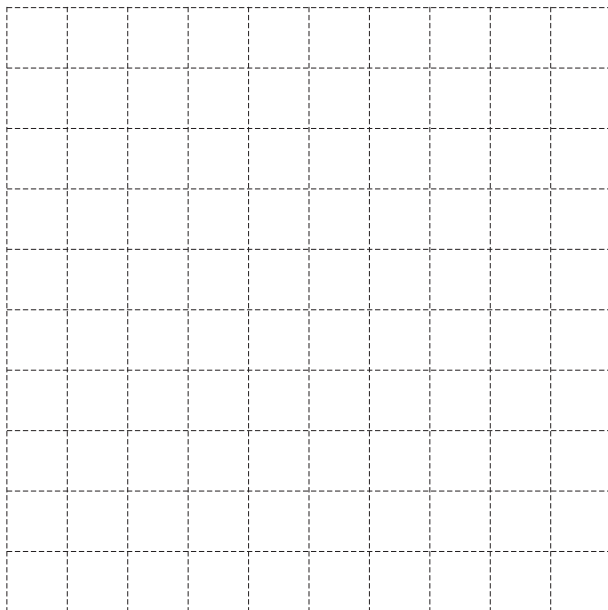
[2]

(ii) Describe fully the **single** transformation that maps triangle *A* onto triangle *C*.

.....  
 .....

[3]

- (b) You may use the grid to help you in answering this question.



The transformation P is a rotation of  $90^\circ$  clockwise about the origin.  
 The transformation Q is a reflection in the line  $y = -x$ .

- (i) Find the image of the point  $(5, -2)$  under the transformation P.

(....., .....) [1]

- (ii) Find the image of the point  $(5, -2)$  under the transformation Q.

(....., .....) [1]

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

.....  
 ..... [2]

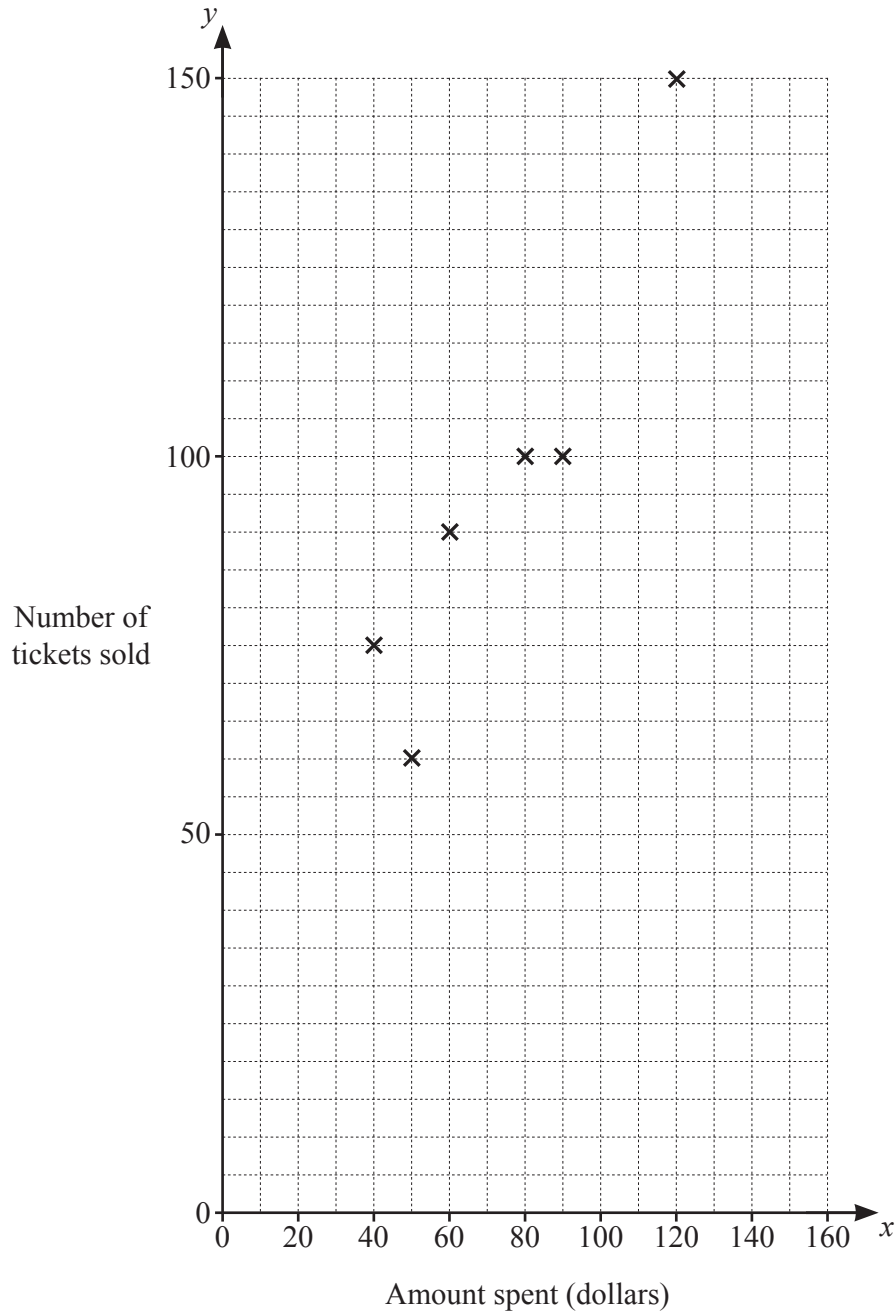
- (iv) Describe fully the **single** transformation equivalent to Q followed by P.

.....  
 ..... [2]

- 3 Petra is a singer. She wants to estimate how much to spend on advertising. The table shows the amount spent on advertising, \$ $x$ , and the number of tickets sold,  $y$ , for 10 performances.

Amount spent (\$ $x$ )	80	60	50	120	90	40	100	110	70	150
Number of tickets sold ( $y$ )	100	90	60	150	100	75	120	120	100	150

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



[2]

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

..... [1]

(b) Find the mean amount of money spent on advertising.

\$ ..... [1]

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

$y = \dots\dots\dots$  [2]

(ii) Use your regression line to estimate the number of tickets sold when Petra spends \$130 on advertising.

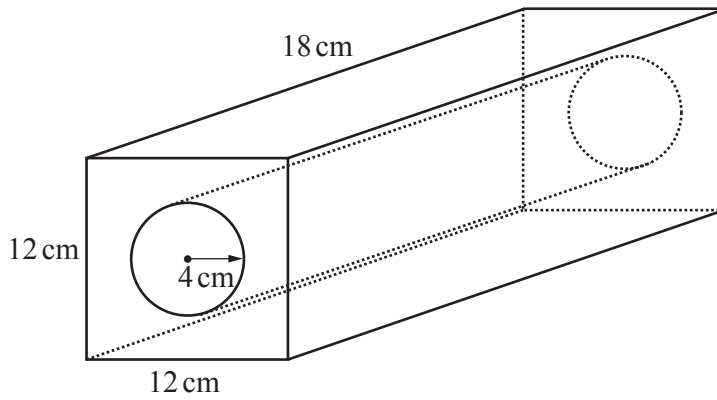
..... [1]

(iii) Explain why Petra should not rely on this regression line to estimate the number of tickets she will sell if she spends \$500 on advertising.

.....

..... [1]

- 4 A piece of metal is in the shape of a cuboid.  
 The cuboid has length 18 cm, width 12 cm and height 12 cm.  
 A cylinder is removed from the cuboid.  
 The cylinder has length 18 cm and radius 4 cm.



NOT TO  
SCALE

- (a) (i) Find the volume of the metal remaining after the cylinder has been removed.

.....  $\text{cm}^3$  [3]

- (ii) Write your answer to **part (i)** in standard form.

.....  $\text{cm}^3$  [1]



(b) Find the total surface area of the metal remaining after the cylinder has been removed.

.....  $\text{cm}^2$  [4]

(c) The **cylinder removed** is melted and formed into 16 identical spheres.

(i) Calculate the volume of **one** sphere.

.....  $\text{cm}^3$  [1]

(ii) Calculate the radius of one sphere.

.....  $\text{cm}$  [2]

- 5 Fifty students, 25 boys and 25 girls, were asked which sport they prefer. The results are shown in the table.

	Athletics	Football	Swimming	Tennis
Boy	4	9	2	10
Girl	3	3	12	7

- (a) A student is selected at random.

Calculate the probability that the student chosen is

- (i) a girl who prefers swimming,

..... [1]

- (ii) a boy who **does not** prefer football,

..... [1]

- (iii) a student who prefers athletics.

..... [1]

- (b) Two of the girls are chosen at random.

Calculate the probability they both prefer tennis.

..... [2]

- (c) Two of the students who prefer athletics are chosen at random.

Calculate the probability that one is a boy and one is a girl.

..... [3]

- (d) Three of the 50 students are chosen at random.

Calculate the probability that one is a boy and two are girls and they all prefer swimming.

..... [4]



6 Herman bought a motorbike on 1 January 2014.  
By 1 January 2015 the value of the motorbike had reduced by 16%.  
By 1 January 2016 the value of the motorbike had reduced by 12% of the value on 1 January 2015.  
The value of the motorbike on 1 January 2016 was \$7392.

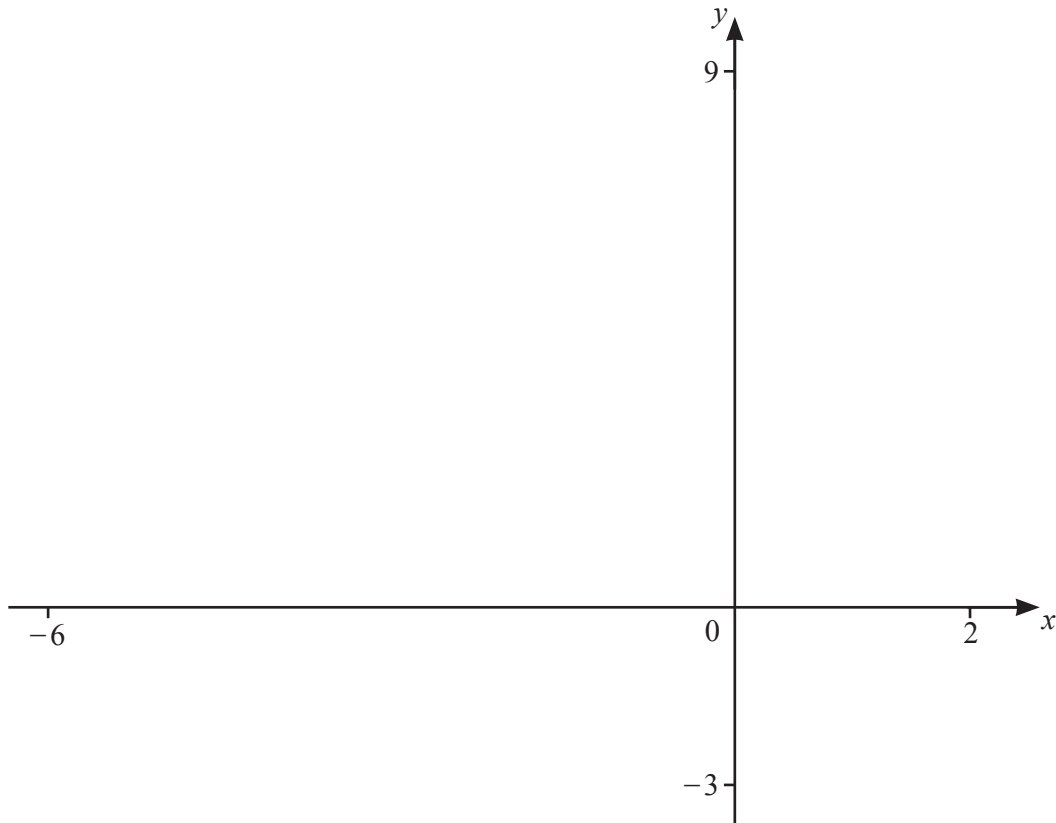
(a) Find how much Herman paid for the motorbike.

\$ ..... [3]

(b) From 2016, the value of the motorbike reduced by 8% each year.

Calculate the number of complete years it will take for the value of the motorbike to decrease from \$7392 to \$5000.

..... [4]



(a)  $f(x) = 2 + \frac{1}{x+2}$

(i) On the diagram, sketch the graph of  $y = f(x)$  for values of  $x$  between  $-6$  and  $2$ . [2]

(ii) Write down the coordinates of the points where the graph crosses the axes.  
(....., .....) and (....., .....) [2]

(iii) Write down the equations of the asymptotes of the graph.  
....., ..... [2]

(b)  $g(x) = (x+4)^2$

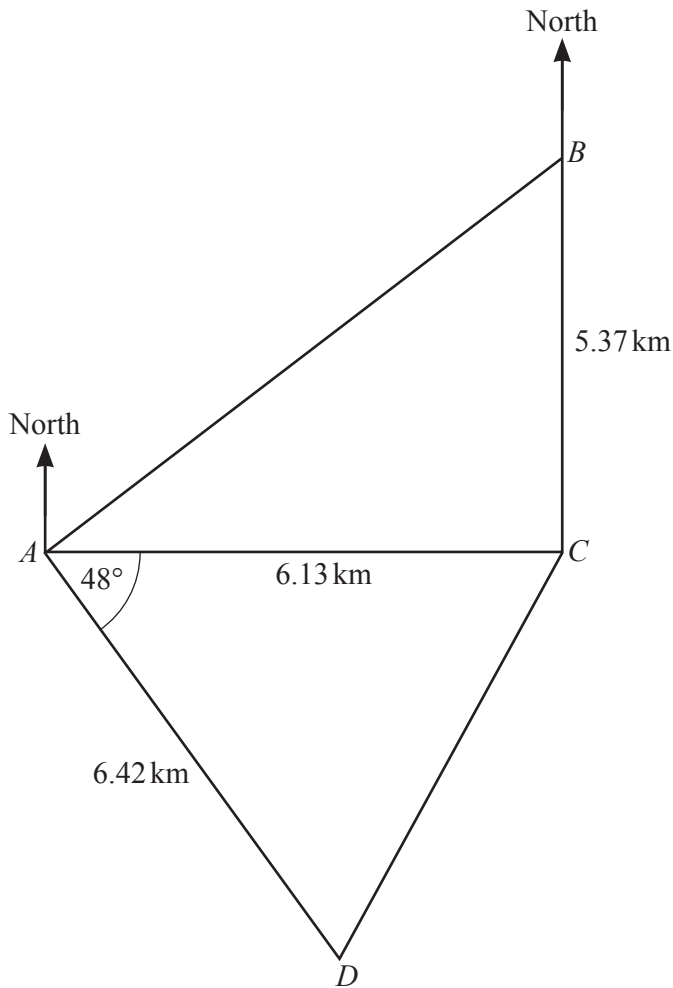
On the diagram, sketch the graph of  $y = g(x)$  for  $-6 \leq x \leq -1$ . [2]

(c) Solve the equation.

$f(x) = g(x)$   
..... [3]

(d) Solve the inequality.

$f(x) \geq g(x)$   
..... [2]



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The diagram shows four points  $A$ ,  $B$ ,  $C$  and  $D$  on horizontal ground.

$B$  is due North of  $C$  and  $C$  is due East of  $A$ .

(a) Find the bearing of

(i)  $D$  from  $A$ ,

..... [1]

(ii)  $A$  from  $D$ .

..... [1]

(b) Calculate angle  $ABC$ .

Angle  $ABC =$  ..... [2]

(c) Calculate the area of quadrilateral  $ABCD$ .

.....  $\text{km}^2$  [3]

(d) Calculate  $CD$ .

$CD =$  .....  $\text{km}$  [3]

(e) Angle  $ACD$  is acute.

Find the bearing of  $D$  from  $C$ .

..... [4]

9       $f(x) = 4 - 3x$        $g(x) = \frac{1}{x-1}, x \neq 1$        $h(x) = x^2$

(a) Find

(i)  $f(2)$ ,

..... [1]

(ii)  $f(g(4))$ .

..... [2]

(b) Find  $g(g(-1))$ .

..... [2]

(c) Solve.

$h(f(x)) = 9$

$x = \dots\dots\dots$  or  $x = \dots\dots\dots$  [3]

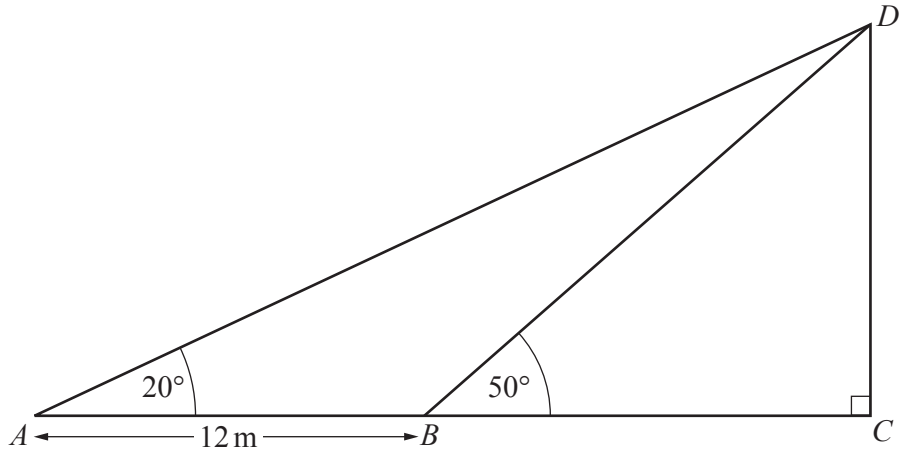
(d) Find  $(f(x))^2 - 1$  in terms of  $x$ .

Give your answer in the form  $k(ax + b)(cx + d)$  where  $a, b, c, d$  and  $k$  are integers.

..... [3]



10



NOT TO SCALE

The diagram shows a vertical pole  $CD$ .  
 $ABC$  is a straight line on level ground.

Find  $DC$ .

$DC = \dots\dots\dots$  m [6]

11 (a) Solve the equations.

(i)  $5 + 2x = 1$

$x = \dots\dots\dots$  [2]

(ii)  $6 - \frac{10}{x} = 1$

$x = \dots\dots\dots$  [2]

(iii)  $3(1 - 2x) = 2 - 4(x - 7)$

$x = \dots\dots\dots$  [3]

(b) (i) Solve  $6x^2 = 7 - 3x$ .

Give your answers correct to 3 decimal places.  
You must show all your working.

$x = \dots\dots\dots$  or  $x = \dots\dots\dots$  [4]

(ii) Solve  $6y^4 = 7 - 3y^2$ .

Give your answers correct to 3 decimal places.

$y = \dots\dots\dots$  or  $y = \dots\dots\dots$  [2]

(c) Solve  $2\log x + \log 5 = 1$ .

$x = \dots\dots\dots$  [4]

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