Cambridge IGCSE

Cambridge International Examinations
Cambridge International General Certificate of Secondary Education

CANDIDATE NAME	
CENTRE NUMBER	
CANDIDATE NUMBER	

7051052947

CAMBRIDGE INTERNATIONAL MATHEMATICS **0607/41**

Paper 4 (Extended) **May/June 2018**

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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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. $\quad A = \pi rl$

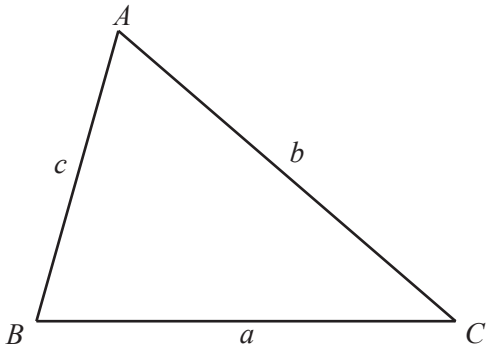
Curved surface area, A, of sphere of radius r. $\quad A = 4\pi r^2$

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. $\quad V = \frac{4}{3}\pi r^3$



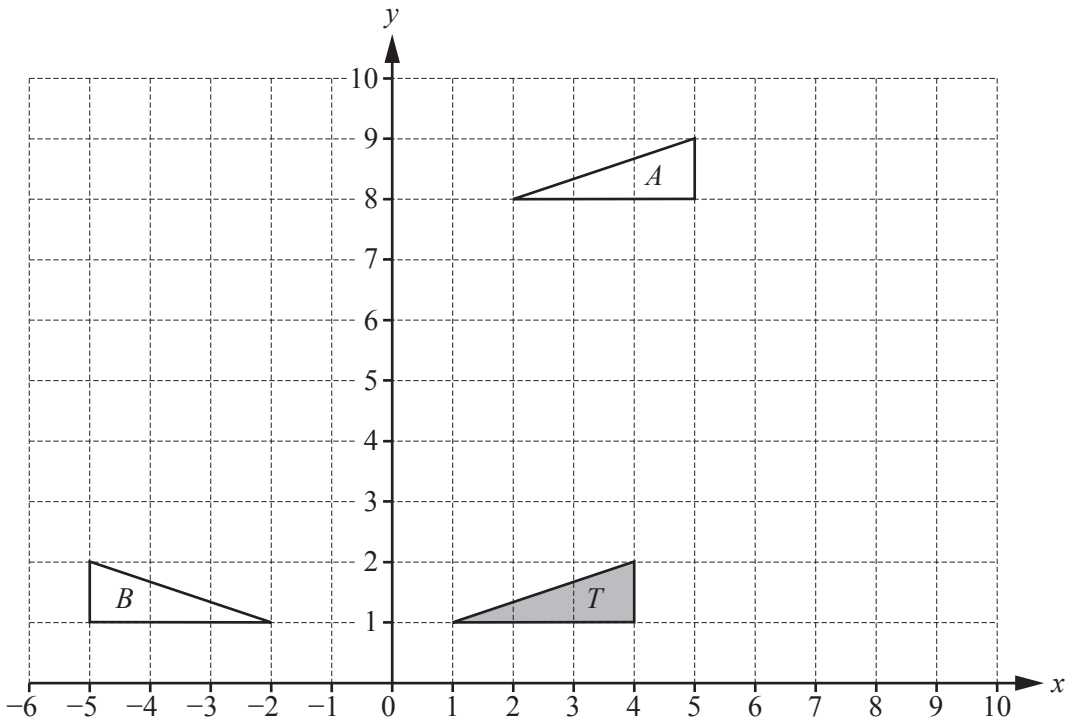
$$\frac{a}{\sin A} = \frac{b}{\sin B} = \frac{c}{\sin C}$$

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

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

Answer **all** the questions.

1



(a) Describe fully the **single** transformation that maps

(i) triangle T onto triangle A,

.....

..... [2]

(ii) triangle T onto triangle B.

.....

..... [2]

(b) Enlarge triangle T with centre (5, 0) and scale factor 2. [2]

(c) Stretch triangle T with the y-axis invariant and factor 2. [2]

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2 Conrad, Delia and Eli share \$8000 in the ratio Conrad : Delia : Eli = 5 : 7 : 8 .

(a) Show that Eli receives \$3200.

[2]

(b) Conrad buys a toy for \$65.
He sells it for \$55.

Calculate the percentage loss.

..... % [3]

(c) Delia invests \$2500 at a rate of 2.5% per year simple interest.

Calculate the interest Delia has at the end of 8 years.

\$ ..... [2]

(d) Eli invests \$2400 at a rate of 2.4% per year compound interest.

Calculate the interest Eli has at the end of 8 years.

\$ ..... [3]

(e) Conrad buys a coat in a sale.
The sale price is \$79.80 after a reduction of 5%.

Calculate the original price of the coat.

\$ ..... [3]

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3 **(a)** Show that the point $(3, -1)$ lies on the line $y = 2x - 7$.

[1]

(b) Find the co-ordinates of the points where the line $y = 8x + 4$ crosses

(i) the x-axis,

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

(ii) the y-axis.

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

(c) Find the equation of the straight line that passes through the points (1, 2) and (4, 11).
Give your answer in the form $y = mx + c$.

$y =$ ..... [3]

4 **(a)** The list shows the temperature, in degrees Celsius, at noon in Paris on each of 14 days.

19	18	21	21	23	21	22
20	24	25	22	21	19	17

(i) Construct an ordered stem and leaf diagram to show this information, including the key.

Key ..... | ..... = ...

[3]

(ii) Find the median and the lower quartile.

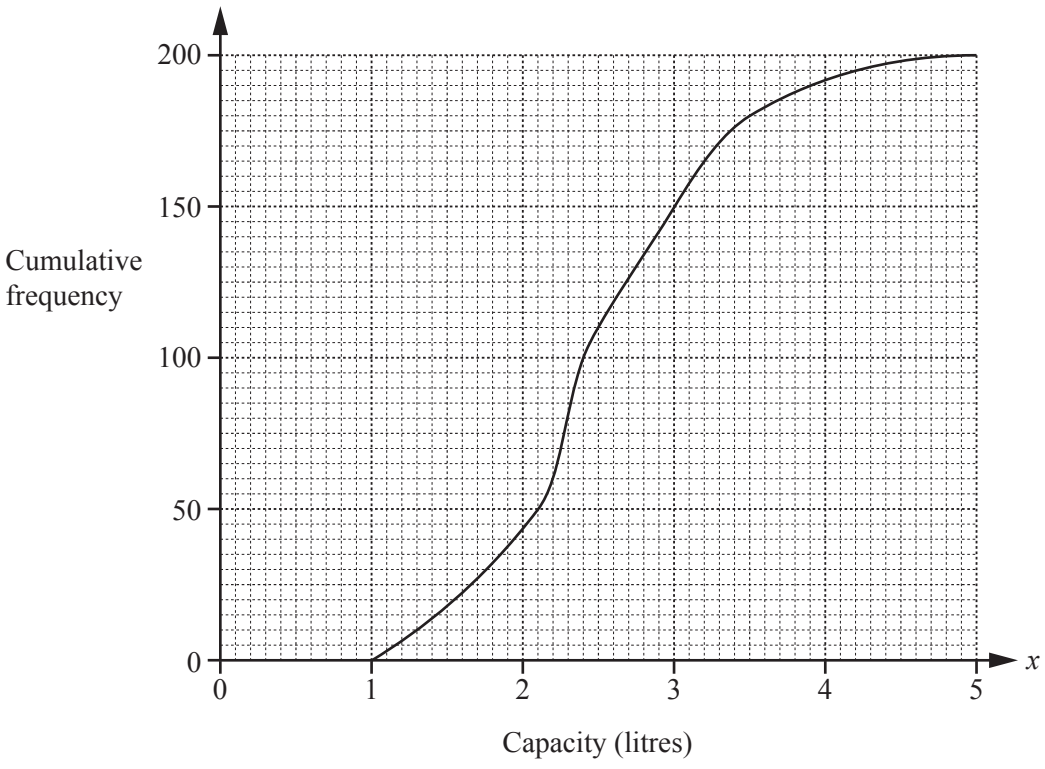
median = ...

lower quartile = ... [2]

(iii) Find the angle on a pie chart that represents the number of days the temperature was less than 20 °C.

..... [2]

(b) 200 students estimated the capacity, x litres, of a container.
The results are shown in the cumulative frequency curve.



Find

(i) the median, ... litres [1]

(ii) the inter-quartile range,

..... litres [2]

(iii) the number of students who estimated more than 3.5 litres.

..... [2]

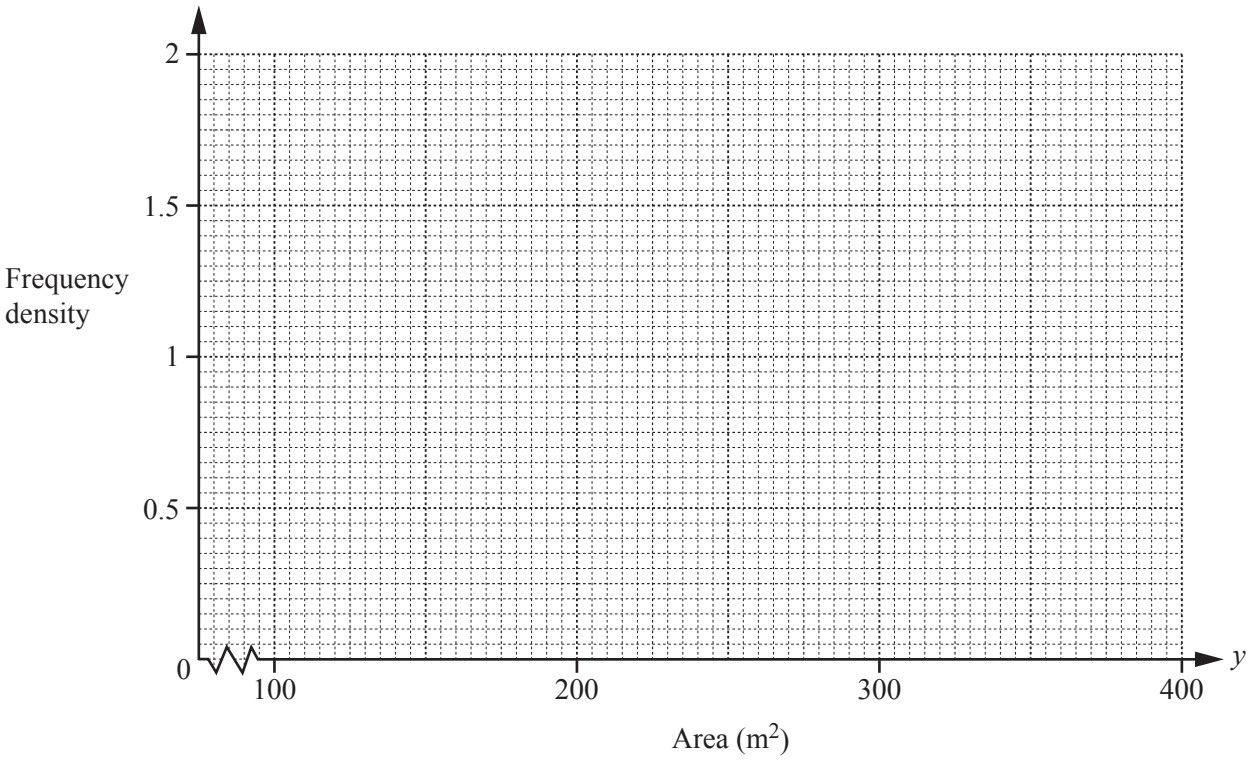
(c) 200 students estimated the area, $y\,m^2$, of a field.
The table shows the results.

Area ($y\,m^2$)	$100 < y \leqslant 200$	$200 < y \leqslant 250$	$250 < y \leqslant 400$
Frequency	25	100	75

(i) Calculate an estimate of the mean.

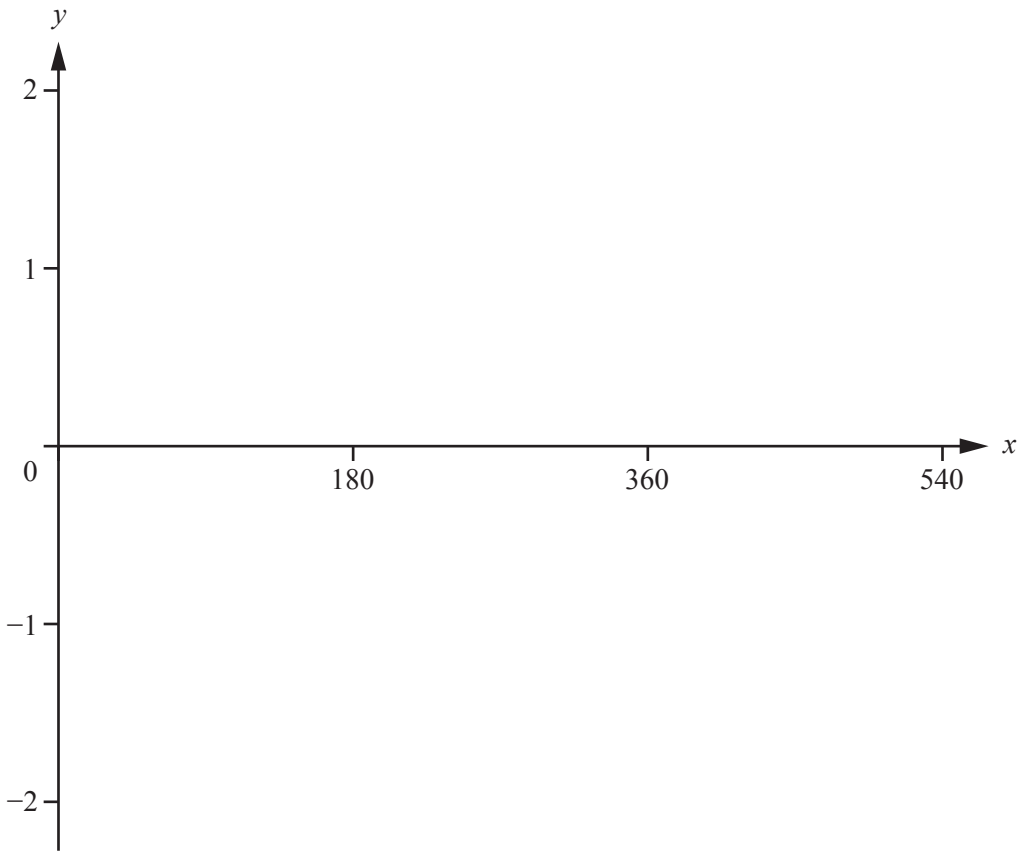
..... m^2 [2]

(ii) Complete the histogram to show the information in the table.



[4]

5



$f(x) = \sin x°$ $\quad$ $g(x) = \log\left(\frac{1}{\sin x°}\right)$

(a) (i) On the diagram, sketch the graph of $y = f(x)$ for $0 \leqslant x \leqslant 540$. [2]

(ii) Write down the range of $f(x)$ for $0 \leqslant x \leqslant 540$.

..... [1]

(b) (i) On the same diagram, sketch the graph of $y = g(x)$ for values of x between 0 and 540. [2]

(ii) Give a reason why there are no values of $g(x)$ for $180 \leqslant x \leqslant 360$.

..... [1]

(iii) Write down the co-ordinates of the minimum points on the graph of $y = g(x)$.

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

(iv) Write down the equations of the four asymptotes to the graph of $y = g(x)$.

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

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(c) (i) $f(k) = g(k)$ and $0 \leqslant k \leqslant 90$.

Find the value of k.

$k =$ ..... [1]

(ii) Solve the inequality $f(x) > g(x)$ for values of x between 0 and 540.

..... [2]

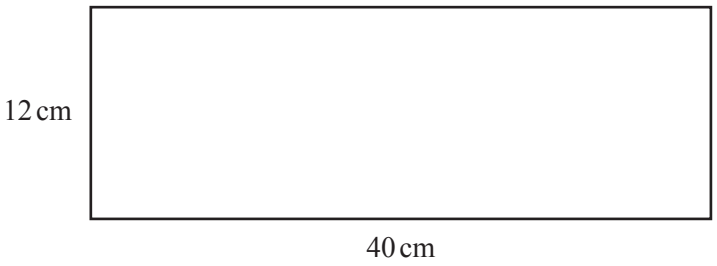
(iii) j is an integer.

The equation $f(x) = j$ has no solutions.
The equation $g(x) = j$ has no solutions.

Write down a possible value of j.

$j =$ ..... [1]

6 (a)



NOT TO SCALE

(i) The rectangle can be made into a hollow cylinder with height 40 cm.

(a) Show that the radius of this cylinder is 1.910 cm, correct to 3 decimal places.

[2]

(b) Calculate the volume of this cylinder.

..... cm^3 [2]

(ii) The rectangle can also be made into a hollow cylinder with height 12 cm.

Calculate the difference between the volumes of this cylinder and the cylinder in **part (i)**. Give your answer correct to the nearest 10 cm^3.

..... cm^3 [4]

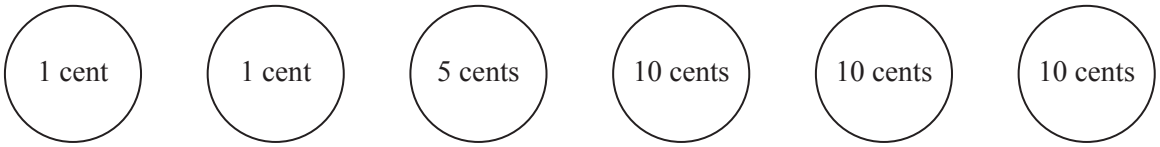
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(b) A model of a car is mathematically similar to the actual car.
The volume of the model is 75 **cubic centimetres** and the volume of the actual car is 4.8 **cubic metres**.
The scale is model : actual = 1 : n .

Find the value of n.

n = ... [4]

7



The diagram shows coins of values 1 cent, 5 cents and 10 cents.
Two of these coins are chosen at random.

Find the probability that

(a) each coin has a value of less than 10 cents,

..... [2]

(b) the total value of the two coins is 11 cents,

..... [3]

(c) the total value of the two coins is more than 2 cents.

..... [2]

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8 Every year the value of Xavier's car decreases by 10%.
The value is now \$12 960.

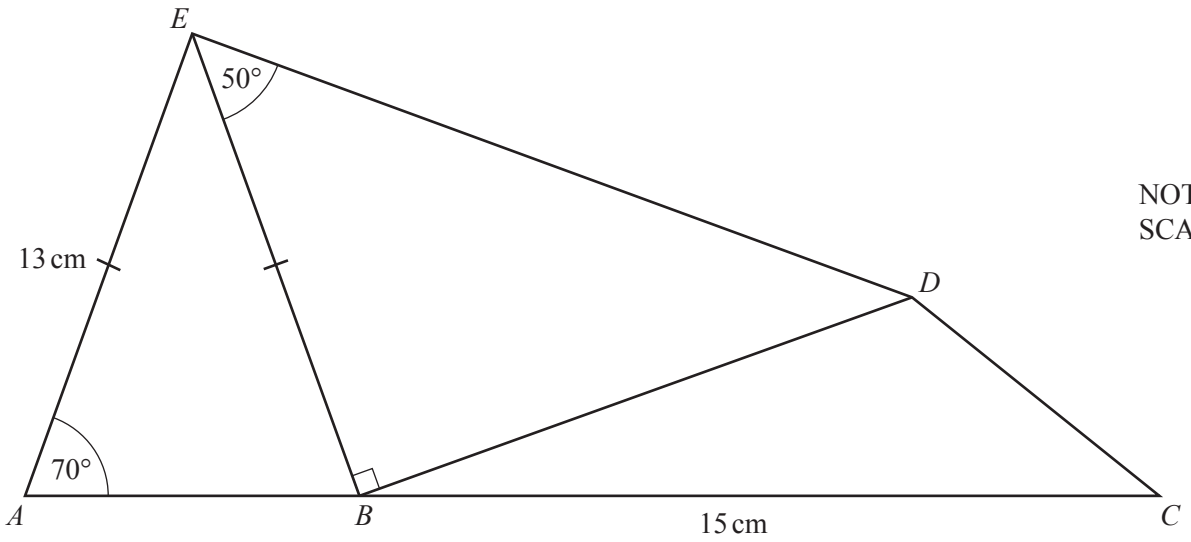
(a) Calculate the value of the car 2 years ago.

\$ ..... [2]

(b) Calculate the number of complete years it will take for the value to decrease from \$12 960 to less than \$6480.

..... [3]

9



NOT TO SCALE

In the diagram, ABC is a straight line, $AE = BE = 13$ cm and $BC = 15$ cm.
Angle $EAB = 70°$, angle $EBD = 90°$ and angle $BED = 50°$.

Calculate

(a) the length of the perpendicular line from E to AB,

..... cm [2]

(b) the length BD,

$BD =$ ..... cm [2]

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(c) the length CD,

$CD =$ ..... cm [4]

(d) the area of the quadrilateral $ACDE$.

..... cm^2 [3]

10 **(a)** Sam walks for 30 minutes at 4 km/h and then runs 5 km in 25 minutes.

Calculate his average speed.
Give your answer in km/h.

..... km/h [3]

(b) **(i)** Tami walks for 10 minutes at x km/h and then runs y kilometres in z minutes.

Find her average speed in terms of x, y and z.
Give your answer in km/h, in its simplest form.

..... km/h [3]

(ii) When Tami walks for 10 minutes at 3 km/h and then runs for 20 minutes, her average speed is 11 km/h.

Find the distance Tami runs.

..... km [2]

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(c) Urs walks for t minutes at 3 km/h and then runs for $(t+10)$ minutes at 7 km/h.

(i) Show that his average speed is $\frac{5t+35}{t+5}$ km/h.

[3]

(ii) When the average speed is $5\frac{1}{2}$ km/h, find the value of t.

$t =$ ..... [2]

11 $f(x) = 10^x$ $g(x) = 2x - 1$

(a) Find the value of g(3).

..... [1]

(b) Find the range of $f(x)$ for the domain $\{-1, 0, 1, 2\}$.

{ ..... } [2]

(c) Find x when $g(x) = 12$.

$x =$ ..... [2]

(d) The graph of $y = g(x)$ is translated by the vector $\begin{pmatrix} 2 \\ 3 \end{pmatrix}$ onto the graph of $h(x)$.

Find $h(x)$.
Give your answer in its simplest form.

$h(x) =$ ..... [3]

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(e) Find $f^{-1}(x)$.

$f^{-1}(x) =$ ..... [2]

(f) $\tan(g(x)) = 1$ and $0° \leqslant x \leqslant 180°$.

Find the two values of x.

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

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