Cambridge Assessment International Education

Cambridge IGCSE™

CANDIDATE NAME									
CENTRE NUMBER						CANDIDATE NUMBER				

2071428902

MATHEMATICS **0580/43**

Paper 4 (Extended) **May/June 2020**

2 hours 30 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 calculator where appropriate.
- You may use tracing paper.
- You must show all necessary working clearly.
- 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 π, use either your calculator value or 3.142.

INFORMATION

- The total mark for this paper is 130.
- The number of marks for each question or part question is shown in brackets [ ].

This document has **24** pages. Blank pages are indicated.

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[Turn over

1 (a)

Campsite fees (per day)	
Tent	$15.00
Caravan	$25.00

The sign shows the fees charged at a campsite.
Today there are 54 tents and 18 caravans on the site.

Calculate the fees charged today.

$ ..... [2]

(b) In September the total income at the campsite was $37 054.
This was a decrease of 4.5% on the total income in August.

Calculate the total income in August.

$ ..... [2]

(c) The visitors to the campsite today are in the ratio

men : women = 5 : 4 and women : children = 3 : 7.

(i) Calculate the ratio men : women : children in its simplest form.

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

(ii) Today there are 224 children at the campsite.

Calculate the total number of men and women.

..... [3]

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(d) The space allowed for each tent is a rectangle measuring 8 m by 6 m, each correct to the nearest metre.

Calculate the upper bound for the area of the space allowed for each tent.

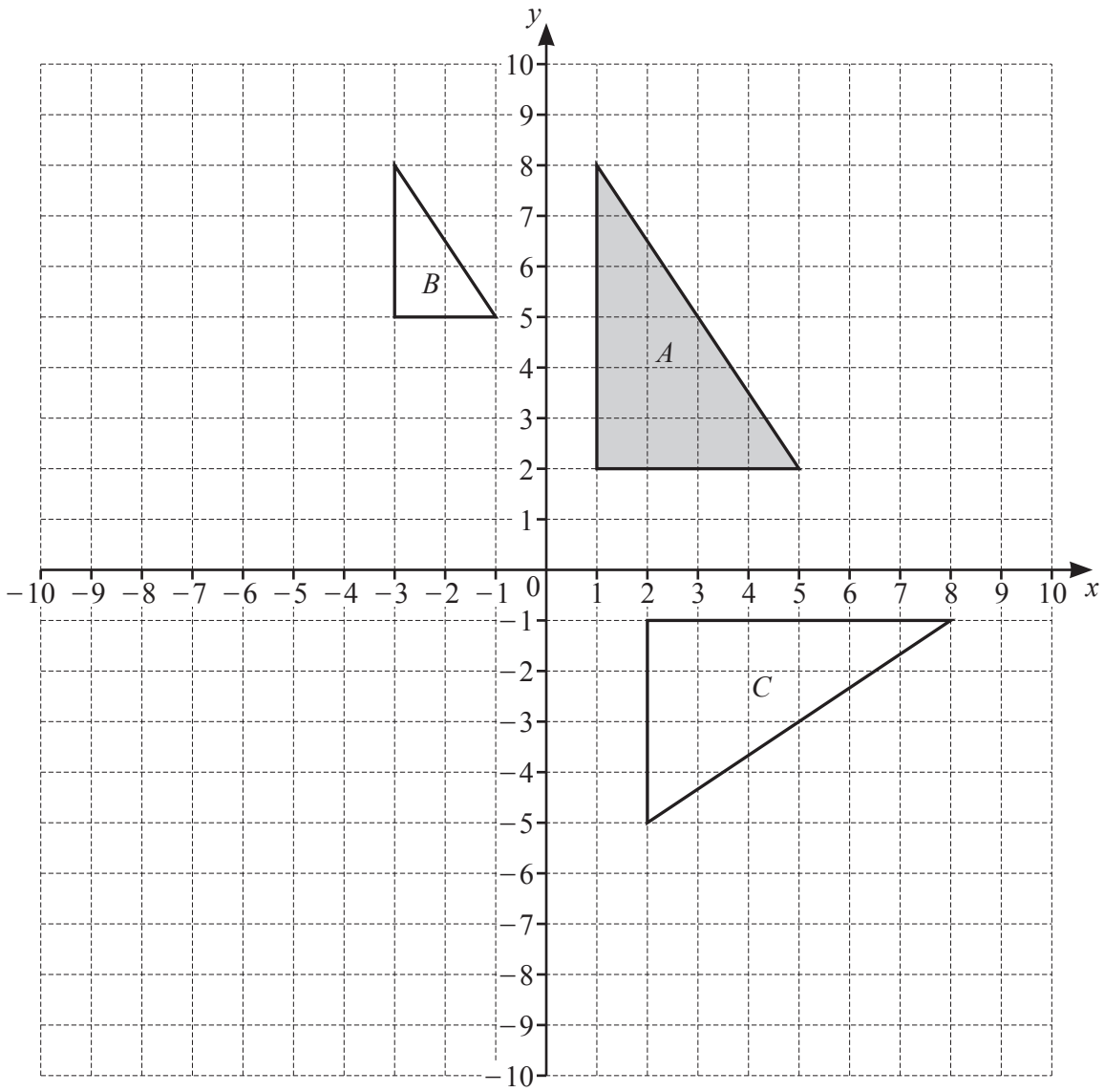
..... m^2 [2]

(e) The value of the campsite has increased exponentially by 1.5% every year since it opened 30 years ago.

Calculate the value of the campsite now as a percentage of its value 30 years ago.

..... % [2]

2



(a) **(i)** Draw the image of triangle A after a reflection in the line $y = -x$. [2]

(ii) Draw the image of triangle A after a translation by the vector $\begin{pmatrix} -2 \\ -9 \end{pmatrix}$. [2]

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

(i) triangle A onto triangle B,

.....

..... [3]

(ii) triangle A onto triangle C.

.....

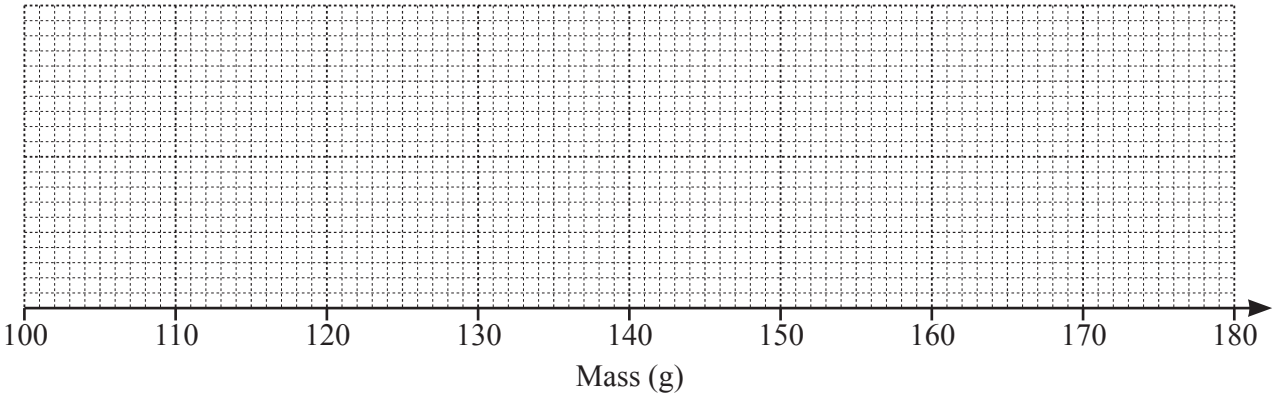
..... [3]

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3 **(a)** Here is some information about the masses of potatoes in a sack:

- The largest potato has a mass of 174 g.
- The range is 69 g.
- The median is 148 g.
- The lower quartile is 121 g.
- The interquartile range is 38 g.

On the grid below, draw a box-and-whisker plot to show this information.



[4]

(b) The table shows the marks scored by some students in a test.

Mark	5	6	7	8	9	10
Frequency	8	2	12	2	0	1

Calculate the mean mark.

..... [3]

4 **(a)** Solve the inequality.

$$3m + 12 \leqslant 8m - 5$$

..... [2]

(b) Solve the equation.

$$\frac{2x+5}{3-x} = \frac{14}{15}$$

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

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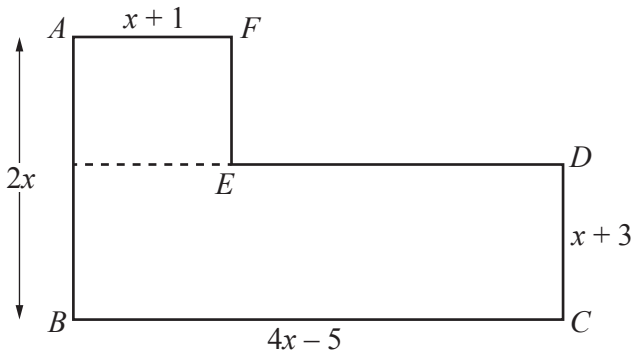
(c) Solve the simultaneous equations.
You must show all your working.

$$y = 4 - x$$
$$x^2 + 2y^2 = 67$$

$x =$ ..... , $y =$ .....

$x =$ ..... , $y =$ ..... [6]

5 All the lengths in this question are in centimetres.



NOT TO SCALE

The diagram shows a shape *ABCDEF* made from two rectangles.
The total area of the shape is 342 cm^2.

(a) Show that $x^2 + x - 72 = 0$.

[5]

(b) Solve by factorisation.

$$x^2 + x - 72 = 0$$

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

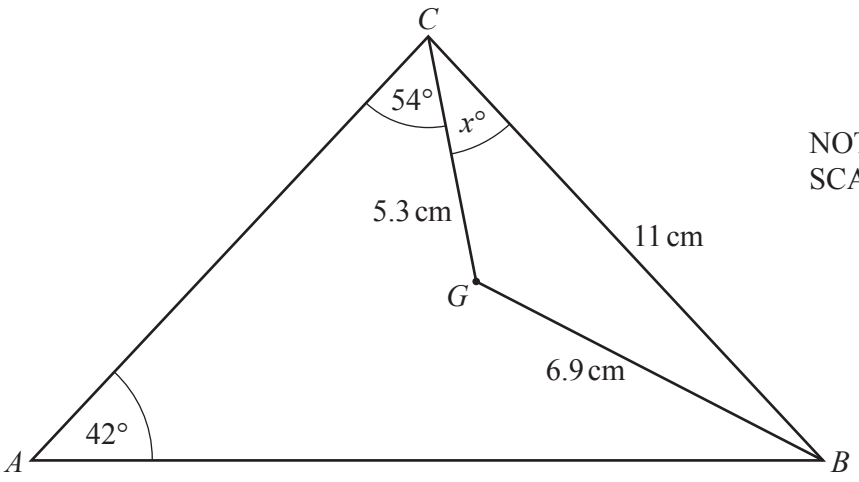
(c) Work out the perimeter of the shape *ABCDEF*.

..... cm [2]

(d) Calculate angle *DBC*.

Angle *DBC* = ... [2]

6 (a)



The diagram shows triangle ABC with point G inside.
$CB = 11$ cm, $CG = 5.3$ cm and $BG = 6.9$ cm.
Angle $CAB = 42°$ and angle $ACG = 54°$.

(i) Calculate the value of x.

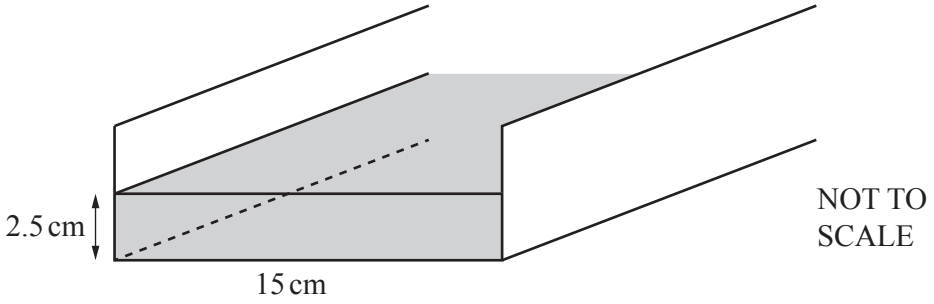
$x =$ ..... [4]

(ii) Calculate AC.

$AC =$ ..... cm [4]

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(b)



Water flows at a speed of 20 cm/s along a rectangular channel into a lake.
The width of the channel is 15 cm.
The depth of the water is 2.5 cm.

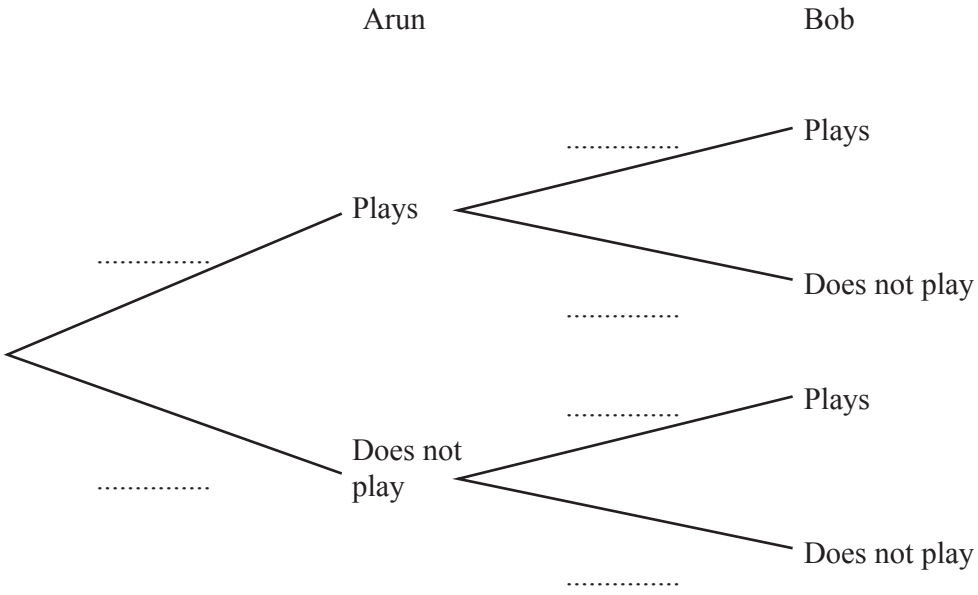
Calculate the amount of water that flows from the channel into the lake in 1 hour.
Give your answer in litres.

..... litres [4]

7 On any Saturday, the probability that Arun plays football is $\frac{3}{4}$.

On any Saturday, the probability that Bob plays football is $\frac{2}{5}$.

(a) (i) Complete the tree diagram.



[2]

(ii) Calculate the probability that, one Saturday, Arun and Bob both play football.

..... [2]

(iii) Calculate the probability that, one Saturday, either Arun plays football or Bob plays football, but not both.

..... [3]

(b) Calculate the probability that Bob plays football for 2 of the next 3 Saturdays.

..... [3]

(c) When Arun plays football, the probability that he scores the winning goal is $\frac{1}{7}$.

Calculate the probability that Arun scores the winning goal one Saturday.

..... [2]

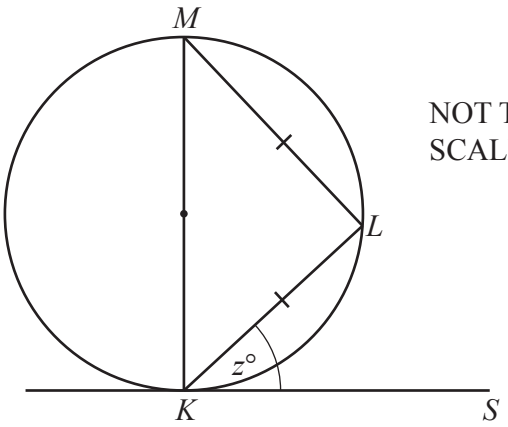
8 **(a)** The interior angle of a regular polygon with n sides is 150°.

Calculate the value of n.

$n =$ ..... [2]

(b) **(i)** K, L and M are points on the circle.
KS is a tangent to the circle at K.
KM is a diameter and
triangle KLM is isosceles.

Find the value of z.

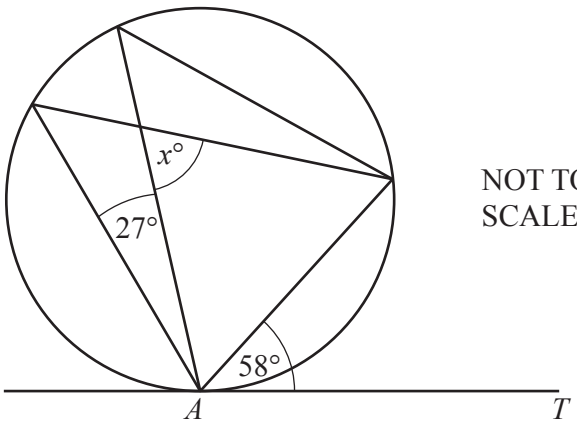


NOT TO SCALE

$z =$ ..... [2]

(ii) AT is a tangent to the circle at A.

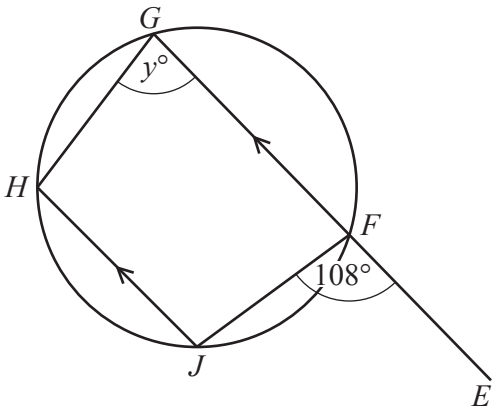
Find the value of x.



NOT TO SCALE

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

(iii)



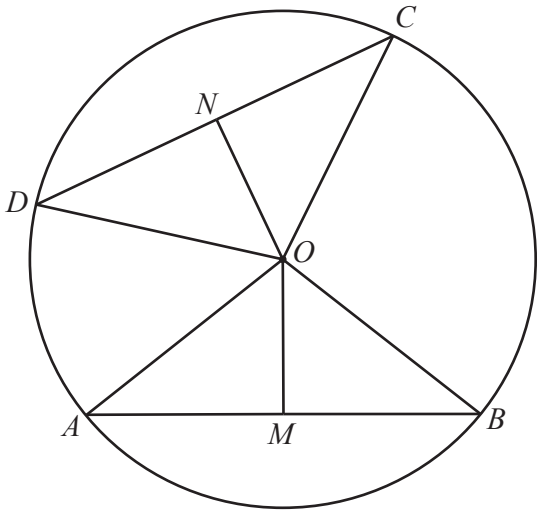
NOT TO SCALE

F, G, H and J are points on the circle.
EFG is a straight line parallel to JH.

Find the value of y.

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

(c)



NOT TO SCALE

A, B, C and D are points on the circle, centre O.
M is the midpoint of AB and N is the midpoint of CD.
$OM = ON$

Explain, giving reasons, why triangle OAB is congruent to triangle OCD.

.....

.....

.....

..... [3]

9 **(a)** The equation of line L is $3x - 8y + 20 = 0$.

(i) Find the gradient of line L.

..... [2]

(ii) Find the coordinates of the point where line L cuts the y-axis.

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

(b) The coordinates of P are $(-3, 8)$ and the coordinates of Q are $(9, -2)$.

(i) Calculate the length PQ.

..... [3]

(ii) Find the equation of the line parallel to PQ that passes through the point $(6, -1)$.

..... [3]

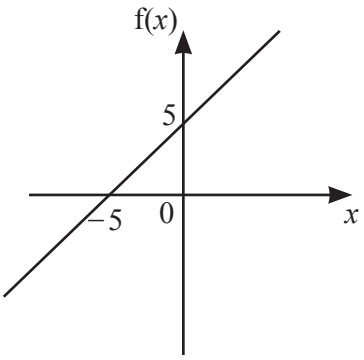
(iii) Find the equation of the perpendicular bisector of PQ.

..... [4]

10 (a) The diagrams show the graphs of two functions.

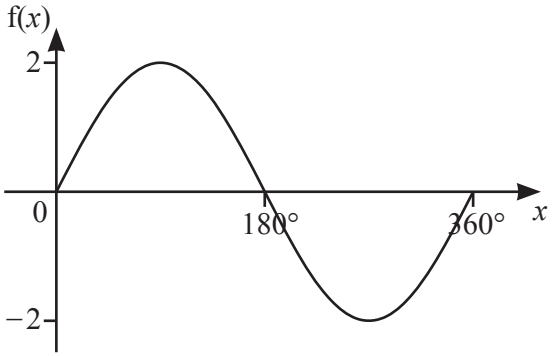
Write down each function.

(i)



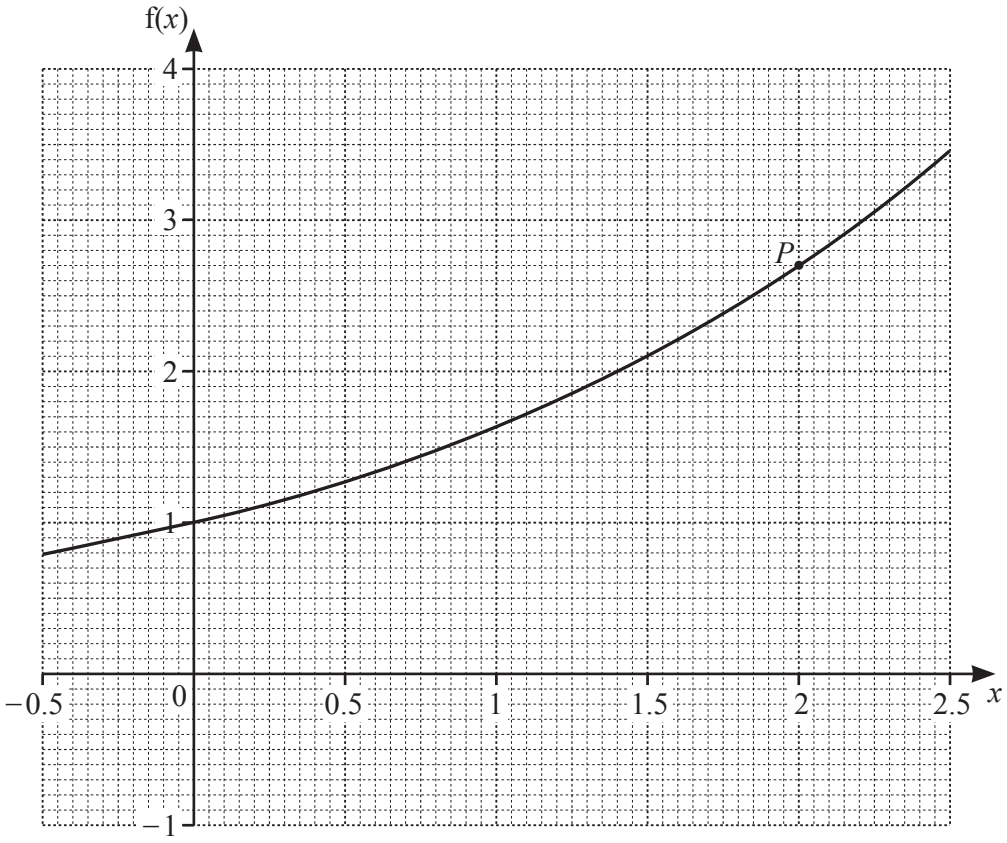
f(x) = ... [2]

(ii)



f(x) = ... [2]

(b)



The diagram shows the graph of another function.

By drawing a suitable tangent, find an estimate for the gradient of the function at the point P.

..... [3]

11 $f(x) = 7x - 4$ $g(x) = \frac{2x}{x-3}$, $x \neq 3$ $h(x) = x^2$

(a) Find $g(6)$.

..... [1]

(b) Find $fg(4)$.

..... [2]

(c) Find $fh(x)$.

..... [1]

(d) Find $\frac{f(x)}{2} + g(x)$.

Give your answer as a single fraction, in terms of x, in its simplest form.

..... [3]

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(e) Find the value of x when $f(x+2) = -11$.

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

(f) Find the values of p that satisfy $h(p) = p$.

..... [2]

12 **(a)** A curve has equation $y = 4x^3 - 3x + 3$.

(i) Find the coordinates of the two stationary points.

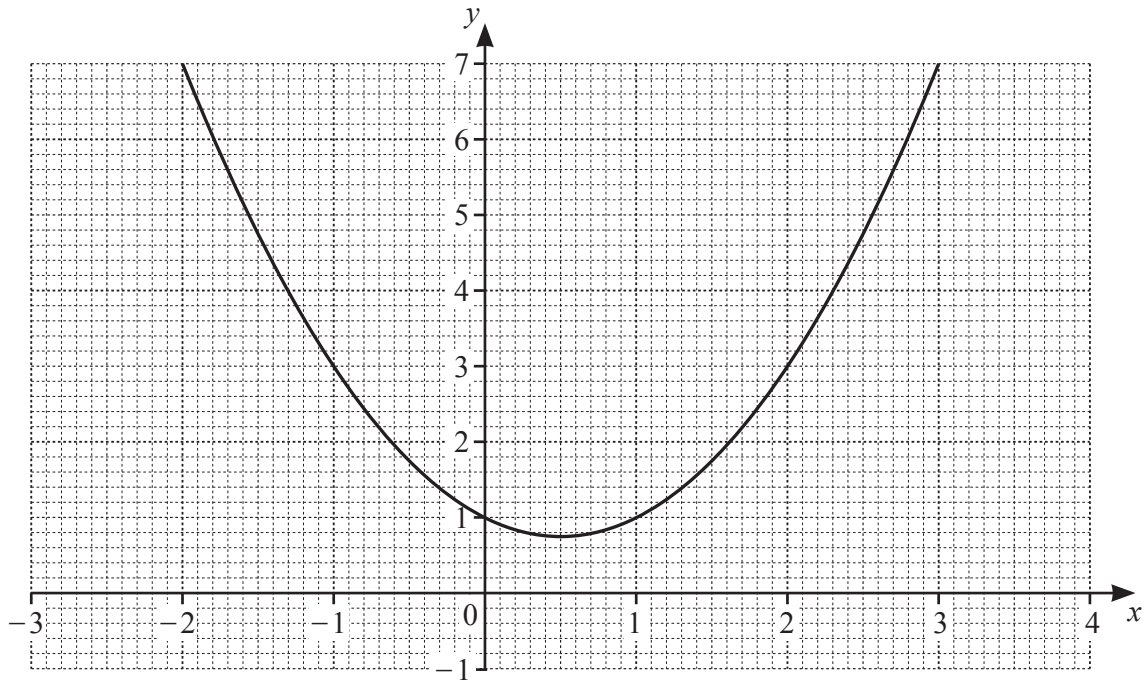
(..... , ...) and (..... , ...) [5]

(ii) Determine whether each of the stationary points is a maximum or a minimum.
Give reasons for your answers.

[3]

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(b) The graph of $y = x^2 - x + 1$ is shown on the grid.



By drawing a suitable line on the grid, solve the equation $x^2 - 2x - 2 = 0$.

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

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