Cambridge Assessment International Education

Cambridge IGCSE™

CANDIDATE NAME									
CENTRE NUMBER						CANDIDATE NUMBER			

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.

© UCLES 2020

1 (a)

View solution

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.

View solution

Calculate the total income in August.

$ ..... [2]

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

View solution

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.

View solution

Calculate the total number of men and women.

..... [3]

© UCLES 2020

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

View solution

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

..... m^2 [2]

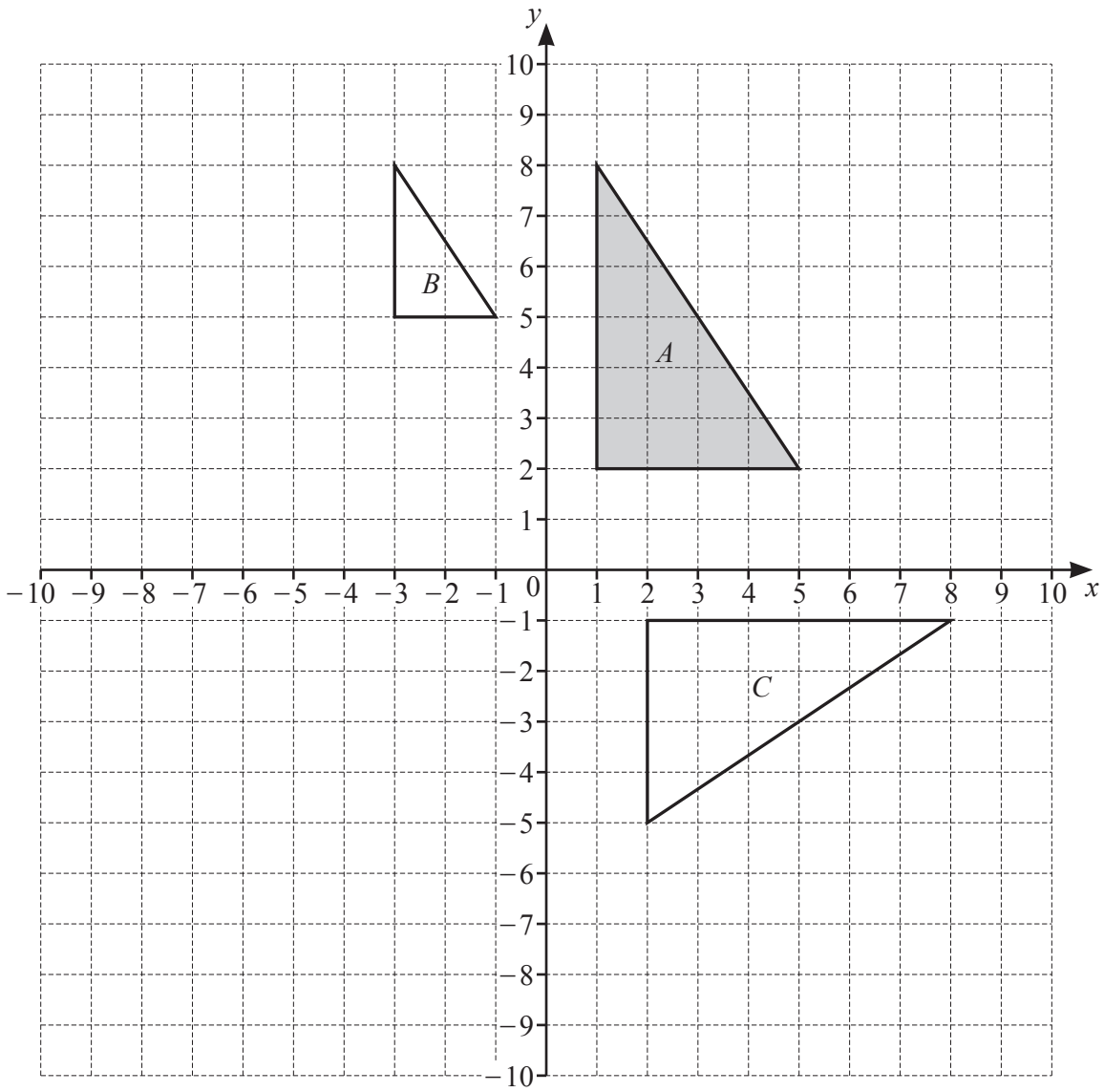
(e) The value of the campsite has increased exponentially by 1.5% every year since it opened 30 years ago.

View solution

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

..... % [2]

2



View solution

(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]

View solution

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

(i) triangle A onto triangle B,

.....

..... [3]

View solution

(ii) triangle A onto triangle C.

.....

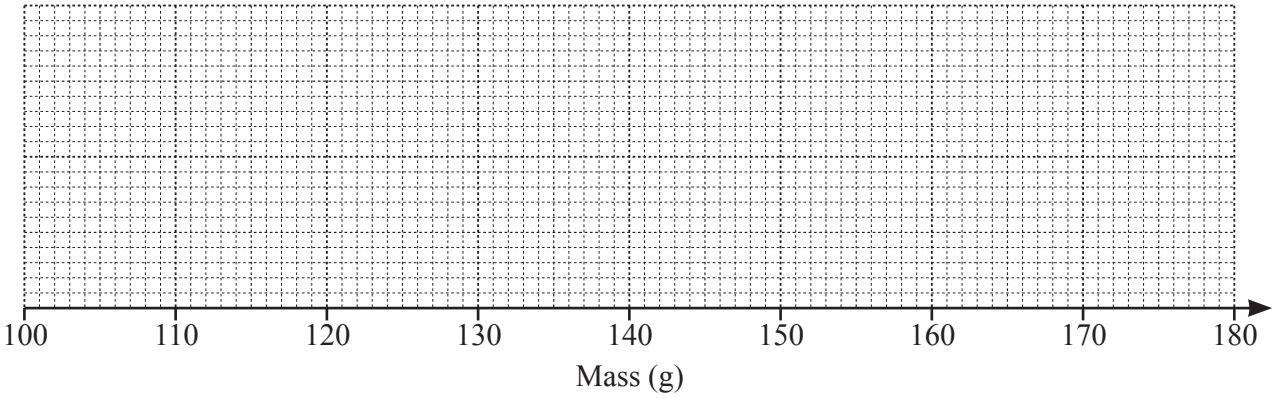
..... [3]

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

View solution

- 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.

View solution

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

Calculate the mean mark.

..... [3]

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

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

View solution

..... [2]

(b) Solve the equation.

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

View solution

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

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

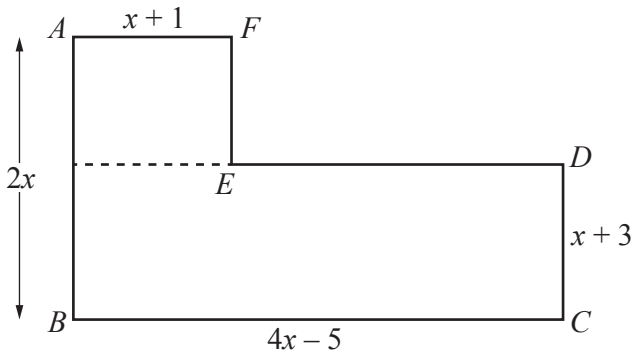
View solution

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

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

$x =$ ..... , $y =$ ..... [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 $x^2 + x - 72 = 0$.

View solution

[5]

(b) Solve by factorisation.

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

View solution

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

© UCLES 2020

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

View solution

..... cm [2]

(d) Calculate angle *DBC*.

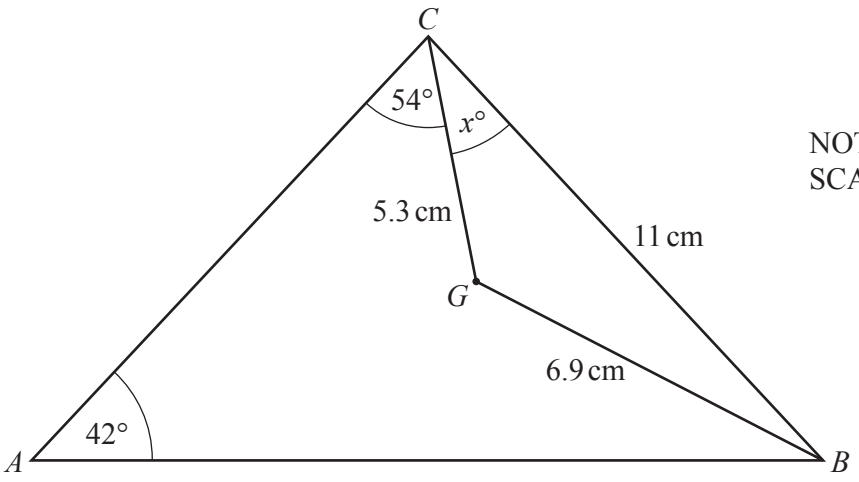
View solution

Angle *DBC* = ... [2]

© UCLES 2020

6 (a)

View solution



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.

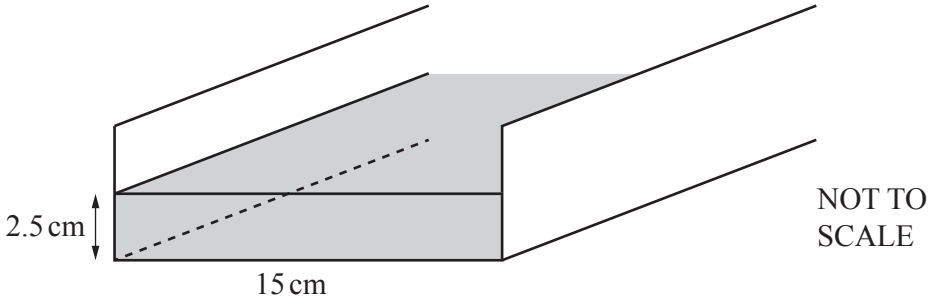
View solution

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

© UCLES 2020

(b)

View solution



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]

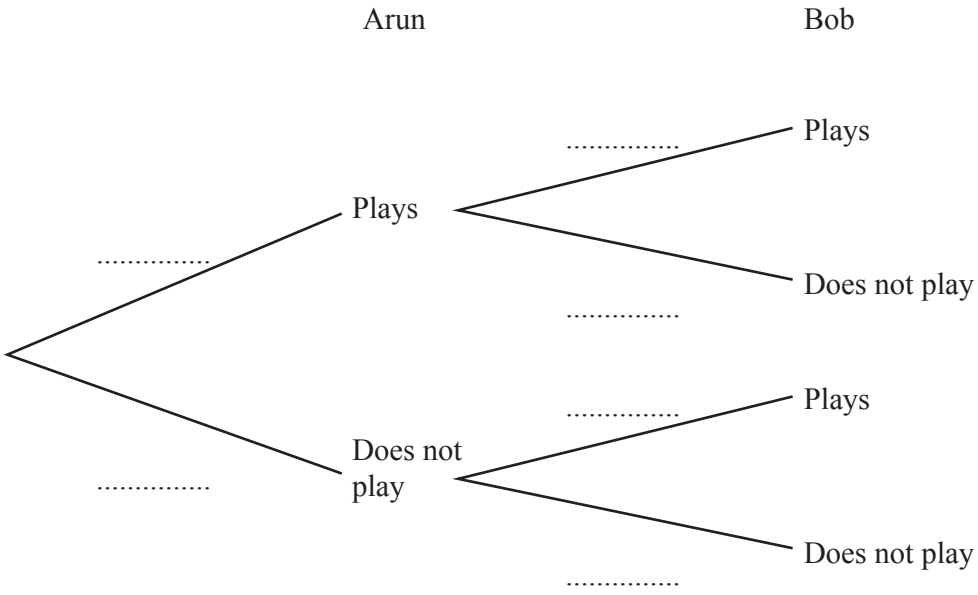
© UCLES 2020

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.

View solution



[2]

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

View solution

..... [2]

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

View solution

..... [3]

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

View solution

..... [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.

View solution

..... [2]

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

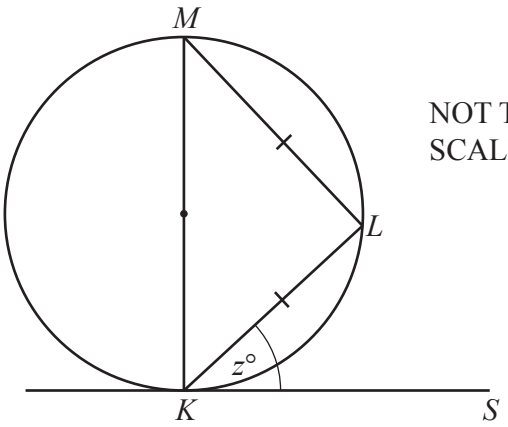
View solution

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.

View solution



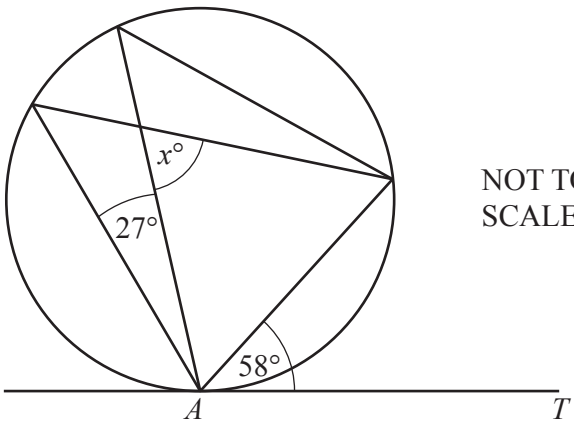
NOT TO SCALE

Find the value of z.

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

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

View solution



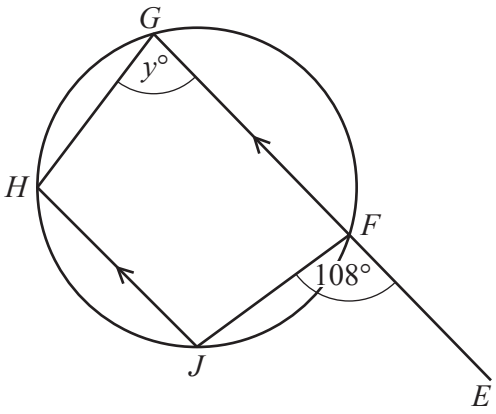
NOT TO SCALE

Find the value of x.

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

(iii)

View solution



NOT TO SCALE

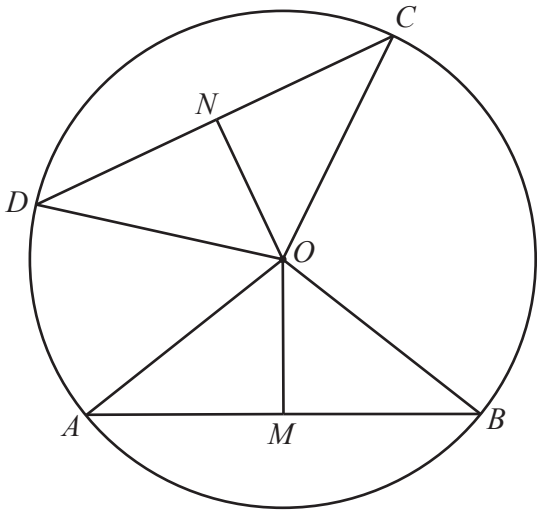
F, G, H and J are points on the circle.
EFG is a straight line parallel to JH.

Find the value of y.

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

(c)

View solution



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 $3x - 8y + 20 = 0$.

View solution

(i) Find the gradient of line L.

..... [2]

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

View solution

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

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

View solution

(i) Calculate the length PQ.

..... [3]

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

View solution

..... [3]

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

View solution

..... [4]

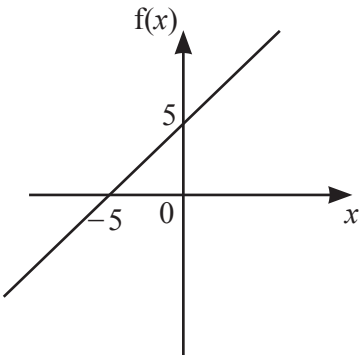
© UCLES 2020

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

View solution

Write down each function.

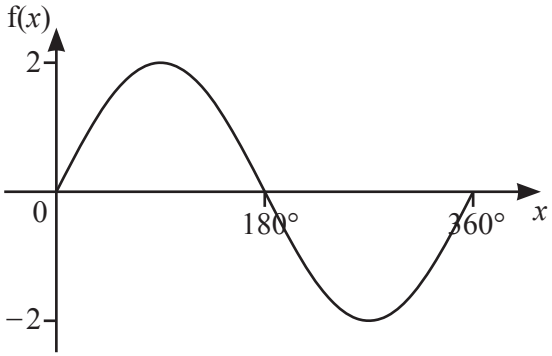
(i)



f(x) = ... [2]

(ii)

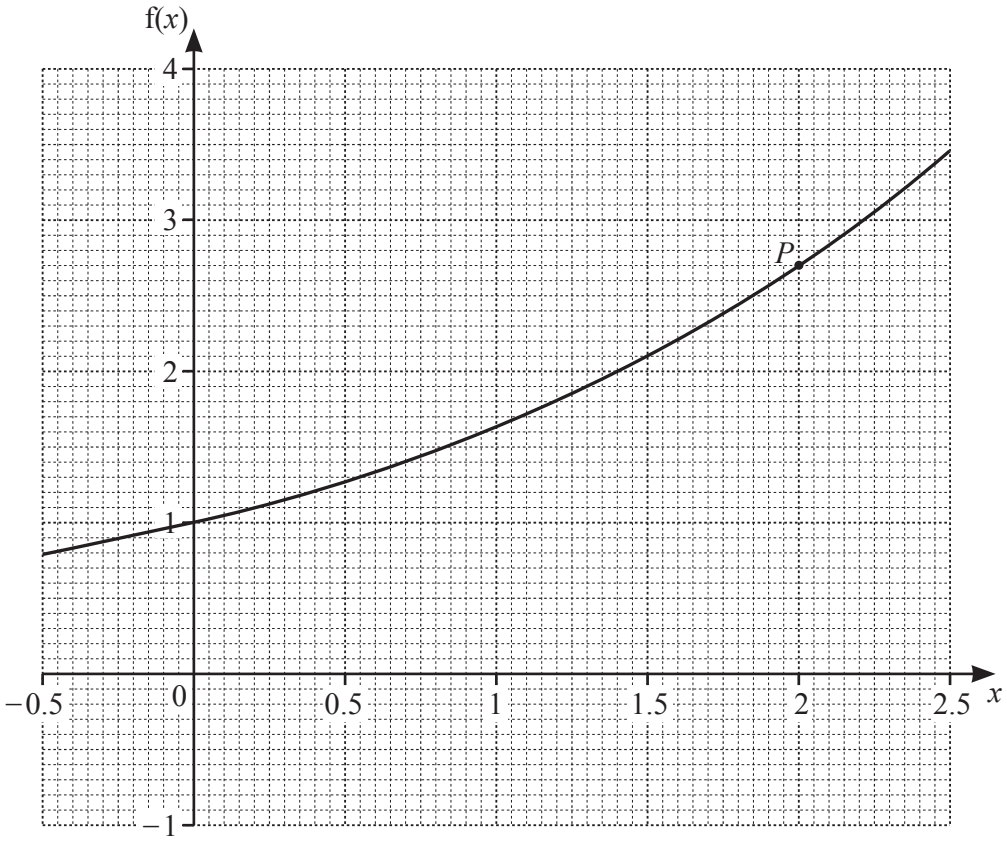
View solution



f(x) = ... [2]

(b)

View solution



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 $g(6)$.

View solution

..... [1]

(b) Find $fg(4)$.

View solution

..... [2]

(c) Find $fh(x)$.

View solution

..... [1]

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

View solution

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

..... [3]

© UCLES 2020

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

View solution

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

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

View solution

..... [2]

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

View solution

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

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

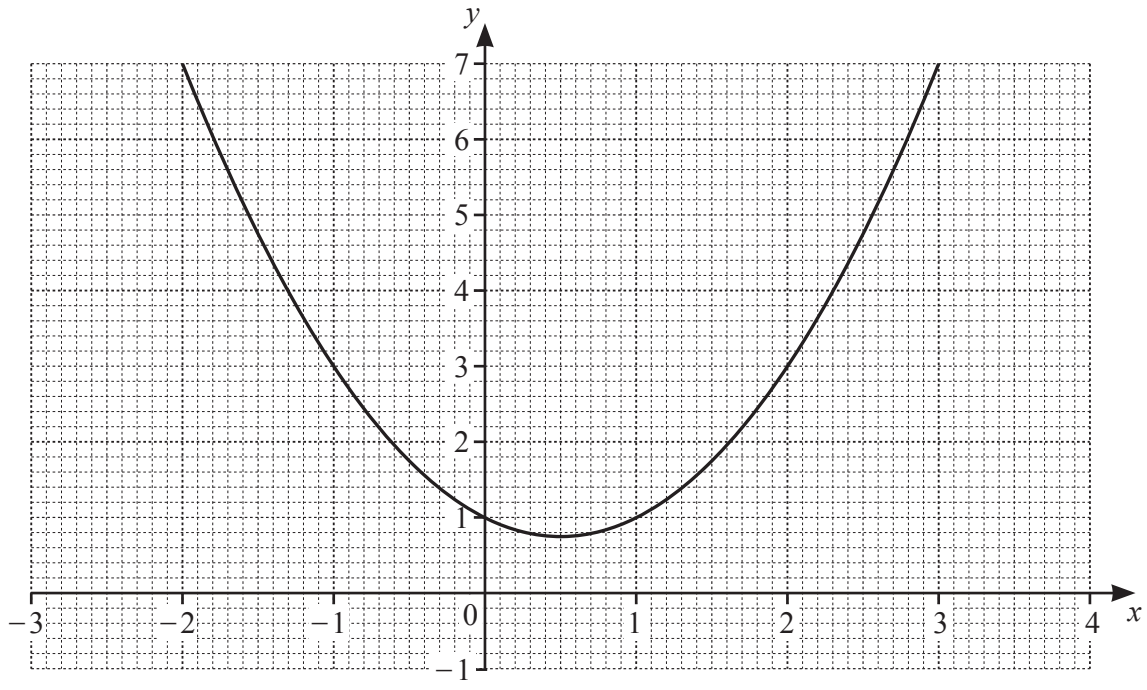
(ii) Determine whether each of the stationary points is a maximum or a minimum. Give reasons for your answers.

View solution

[3]

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

View solution



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

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

BLANK PAGE

Permission to reproduce items where third-party owned material protected by copyright is included has been sought and cleared where possible. Every reasonable effort has been made by the publisher (UCLES) to trace copyright holders, but if any items requiring clearance have unwittingly been included, the publisher will be pleased to make amends at the earliest possible opportunity.

To avoid the issue of disclosure of answer-related information to candidates, all copyright acknowledgements are reproduced online in the Cambridge Assessment International Education Copyright Acknowledgements Booklet. This is produced for each series of examinations and is freely available to download at www.cambridgeinternational.org after the live examination series.

Cambridge Assessment International Education is part of the Cambridge Assessment Group. Cambridge Assessment is the brand name of the University of Cambridge Local Examinations Syndicate (UCLES), which itself is a department of the University of Cambridge.