Cambridge Assessment International Education

# Cambridge IGCSE™

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| CANDIDATE NAME | | | | | | | | | |
| CENTRE NUMBER | | | | | | CANDIDATE NUMBER | | | | |

**MATHEMATICS** **0580/43**

Paper 4 (Extended) **October/November 2023**

**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 $\pi$, 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 **20** pages. Any blank pages are indicated.

© UCLES 2023

**1** The table shows the amount received when exchanging **$100** in some countries.

| Country | Amount received for $100 |
|---|---|
| Wales | 77.05 pounds |
| India | 7437.05 rupees |
| China | 671.20 yuan |
| Spain | 85.35 euros |

**(a)** Brad changes $250 to Indian rupees.

View solution

Calculate the amount he receives correct to the nearest rupee.

..... rupees [2]

**(b)** Wang changes 5400 Chinese yuan into dollars.

View solution

Calculate how much he receives in dollars, correct to the nearest cent.

$ ..... [2]

**(c)** Gretal lives in Spain and goes on holiday to Wales.
She spends 3500 euros in total on travel and hotels in the ratio

View solution

$$\text{travel} : \text{hotels} = 4 : 3.$$

**(i)** Work out how much Gretal spends, in euros, on travel.

..... euros [2]

**(ii)** Work out how much she spends, **in pounds**, on hotels.

View solution

..... pounds [3]

**(iii)** Gretal flies home to Spain.
The plane flies a distance of 2200 km, correct to the nearest 100 km.
The average speed of the plane is 740 km/h, correct to the nearest 20 km/h.

View solution

Calculate the lower bound of the time taken, in hours and minutes, for this flight.

..... h ..... min [3]

**2** The table shows the number of each type of bird seen in a garden on Monday.

| Type of bird | Frequency | Pie chart sector angle |
|---|---|---|
| Goldfinch | 8 | 96° |
| Jay | 6 | |
| Starling | 11 | |
| Robin | 5 | |

**(a)** Find the percentage of the birds that are Starlings.

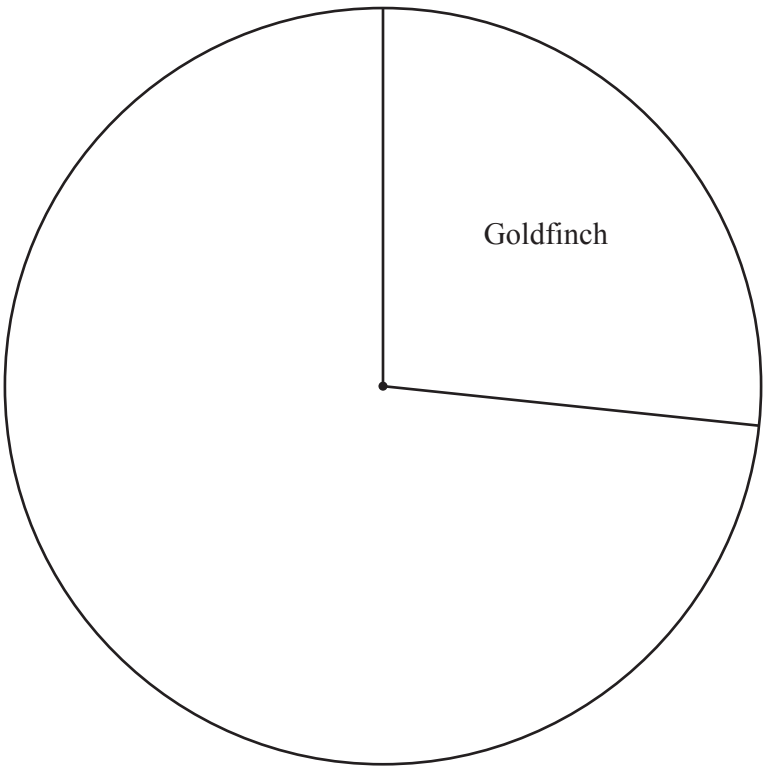
View solution

..... % [2]

**(b)** **(i)** In the table, complete the column for the pie chart sector angle. [2]

**(ii)** Complete the pie chart to show the information in the table.

View solution




[2]

**(c)** On Tuesday, the number of Goldfinches seen in the garden increased by 262.5%.

View solution

Calculate the number of Goldfinches seen on Tuesday.

..... [2]

**(d)** One of the most common birds in the world is the Red-Billed Quelea which lives in Sub-Saharan Africa.
There are approximately 1500 million of these birds in this area.

View solution

**(i)** Write 1500 million in standard form.

..... [1]

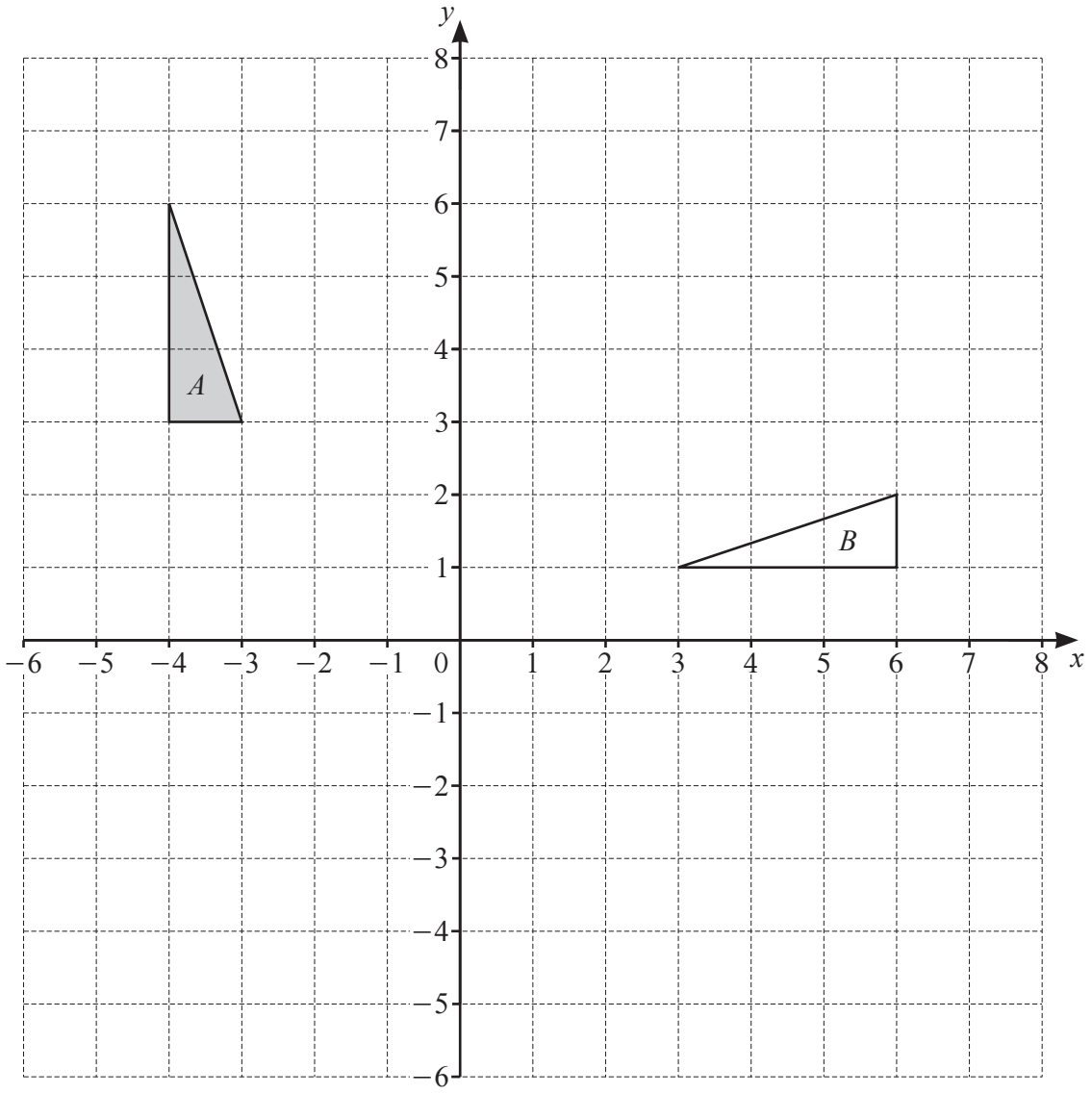
**(ii)** The land area of Sub-Saharan Africa is approximately 21.2 million square kilometres.

View solution

Work out the average number of these birds per square kilometre.

..... birds/$km^2$ [2]

**3**




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

View solution

.....

..... [3]

**(b)** Draw the image of triangle $A$ after

**(i)** a reflection in the line $y = 1$ [2]

**(ii)** a translation by the vector $\begin{pmatrix} 5 \\ -7 \end{pmatrix}$ [2]

**(iii)** an enlargement, scale factor 2, centre $(-4,\ 5)$. [2]

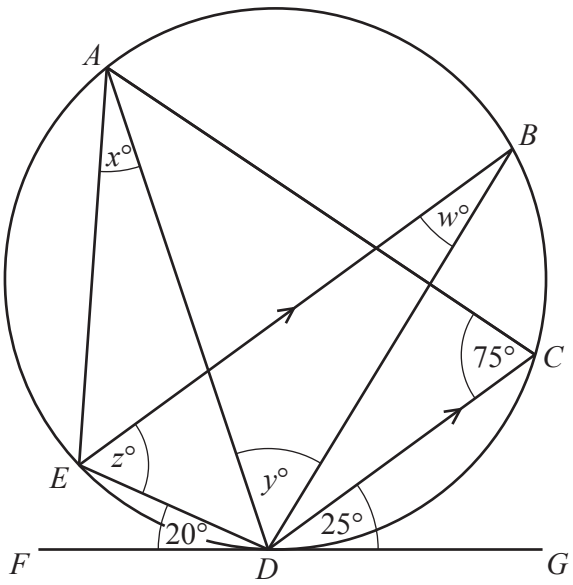
View solution

**4** **(a)** Find the size of one interior angle of a regular 10-sided polygon.

View solution

..... [2]

**(b)**




View solution

NOT TO SCALE

The points $A$, $B$, $C$, $D$ and $E$ lie on a circle.
$FG$ is a tangent to the circle at $D$.
$EB$ is parallel to $DC$.

Find the value of each of $w$, $x$, $y$ and $z$.

$w =$ .....

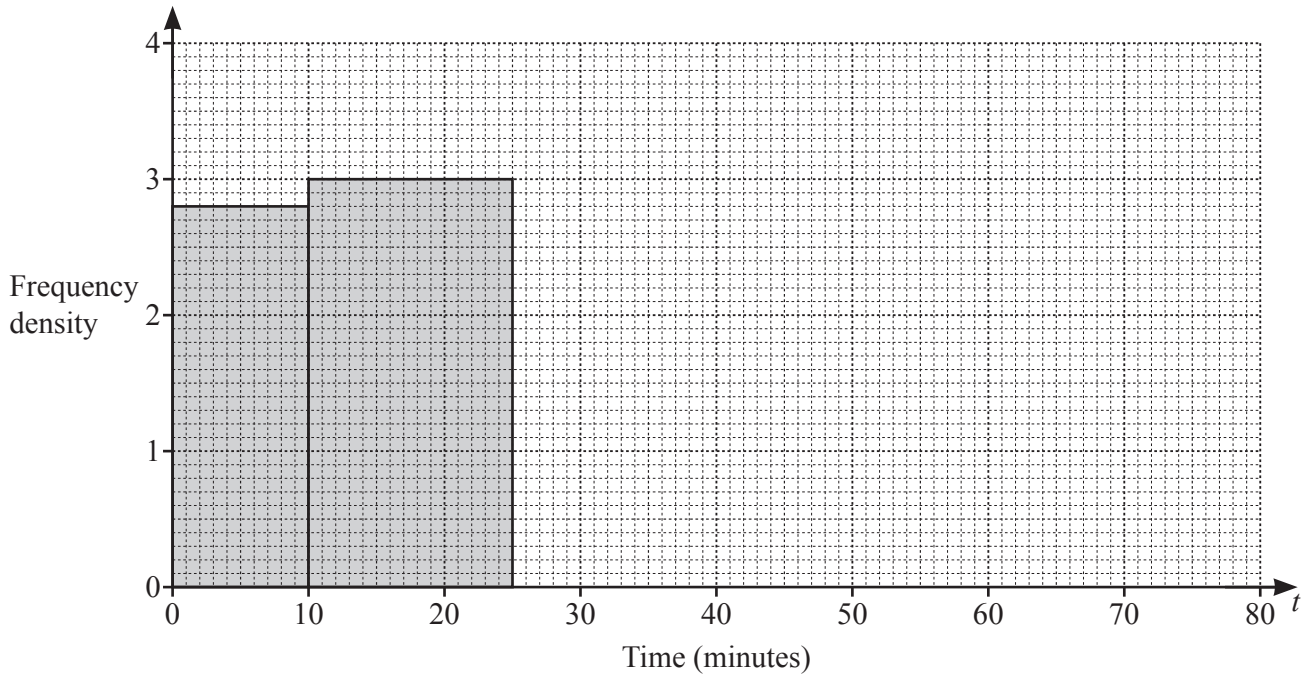
$x =$ .....

$y =$ .....

$z =$ ..... [5]

**5** Indira records the time taken for workers in her company to travel to work.
The table and the histogram each show part of this information.

| Time ($t$ minutes) | $0 < t \leqslant 10$ | $10 < t \leqslant 25$ | $25 < t \leqslant 40$ | $40 < t \leqslant 60$ | $60 < t \leqslant 80$ |
|---|---|---|---|---|---|
| Frequency | | | 57 | 38 | 12 |




**(a)** Complete the table and the histogram.

View solution

[5]

**(b)** Calculate an estimate of the mean time.

View solution

..... min [4]

**(c)** Rashid says:

View solution

‘The longest time that any of these workers take to travel to work is 80 minutes.’

Give a reason why Rashid may be wrong.

.....

..... [1]

**(d)** Indira picks three workers at random from those who take longer than 25 minutes to travel to work.

Calculate the probability that one worker takes 60 minutes or less and the other two each take more than 60 minutes.

View solution

..... [4]

**6** $f(x) = 5x - 3$ $g(x) = 64^x$ $h(x) = \frac{2}{x+1}, \quad x \neq -1$

View solution

**(a)** Find the value of

**(i)** $f(2)$

..... [1]

**(ii)** $gf(0.5)$.

View solution

..... [2]

**(b)** Find $h^{-1}(x)$.

View solution

$h^{-1}(x) =$ ..... [3]

**(c)** Find $x$ when $g(x) = \frac{1}{2^5}$.

View solution

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

**(d)** Write as a single fraction in its simplest form $\frac{1}{f(x)} - h(x)$.

View solution

..... [4]

© UCLES 2023

**7** **(a)** Complete the table of values for $y = 3\cos 2x°$.
Values are given correct to 1 decimal place.

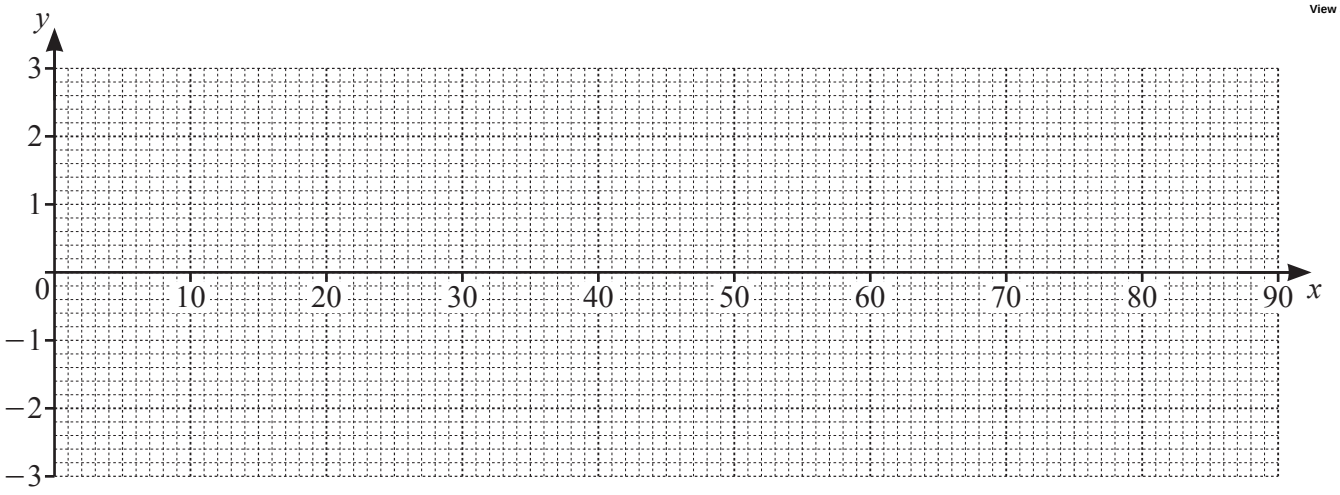
View solution

| $x$ | 0 | 10 | 20 | 30 | 40 | 45 | 50 | 60 | 70 | 80 | 90 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| $y$ | 3.0 | 2.8 | 2.3 | 1.5 | 0.5 | | −0.5 | | −2.3 | | −3.0 |

[3]

**(b)** Draw the graph of $y = 3\cos 2x°$ for $0 \leqslant x \leqslant 90$.

View solution




[4]

**(c)** Use your graph to solve the equation $3\cos 2x° = -2$ for $0 \leqslant x \leqslant 90$.

View solution

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

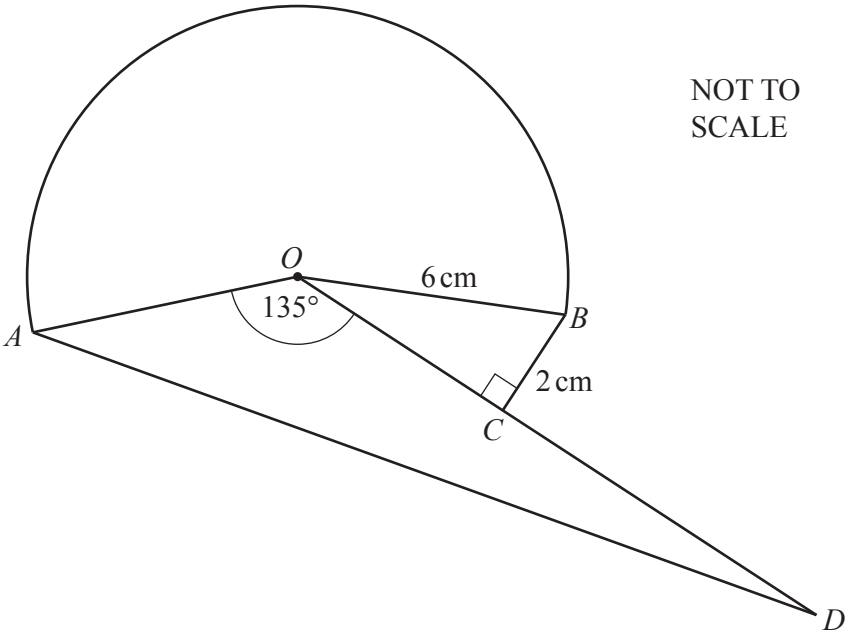
**(d)** By drawing a suitable straight line, solve the equation $120\cos 2x° = 80 - x$ for $0 \leqslant x \leqslant 90$.

View solution

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

**8 (a)**

View solution




The diagram shows a shape made from a major sector $AOB$ and triangles $OBC$ and $AOD$.
$OB = 6\,\text{cm}$, $BC = 2\,\text{cm}$, obtuse angle $AOC = 135°$ and angle $BCO = 90°$.

**(i)** Show that angle $BOC = 19.5°$, correct to 1 decimal place.

[2]

**(ii)** Calculate the area of the major sector $AOB$.

View solution

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

**(iii)** $C$ is the midpoint of $OD$.

Calculate $AD$.

View solution

..... cm [5]

**(iv)** Calculate the total area of the shape.

View solution

..... $cm^2$ [4]

**(b)** A sector of a circle has radius 8 cm and area 160 $cm^2$.
A mathematically similar sector has radius 20 cm.

Calculate the area of the larger sector.

View solution

..... $cm^2$ [3]

**9** $A$ is the point (0, 2), $B$ is the point (3, 3) and $C$ is the point (4, 0).

**(a)** Determine if triangle $ABC$ is scalene, isosceles or equilateral.
You must show all your working.

View solution

[4]

**(b)** **(i)** Find the equation of the line $AC$.
Give your answer in the form $y = mx + c$.

View solution

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

**(ii)** Find the equation of the perpendicular bisector of $AC$.
Give your answer in the form $y = mx + c$.

View solution

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

© UCLES 2023

**(iii)** *ABCD* is a kite.
The point *D* has coordinates $(w, 4w + 1)$.

View solution

Find the coordinates of *D*.

( ..... , ..... ) [3]

**10** **(a)** Expand and simplify.

View solution

$$4(2x-1)-6(3-x)$$

..... [2]

**(b)** Factorise completely.

View solution

**(i)** $6x^2y+9xy$

..... [2]

**(ii)** $4x^2-y^2+8x+4y$

View solution

..... [3]

**(c)** Antonio travels 100 km at an average speed of $x$ km/h.
He then travels a further 150 km at an average speed of $(x + 10)$ km/h.
The time taken for the whole journey is 4 hours 20 minutes.

View solution

**(i)** Show that $13x^2 - 620x - 3000 = 0$.

[4]

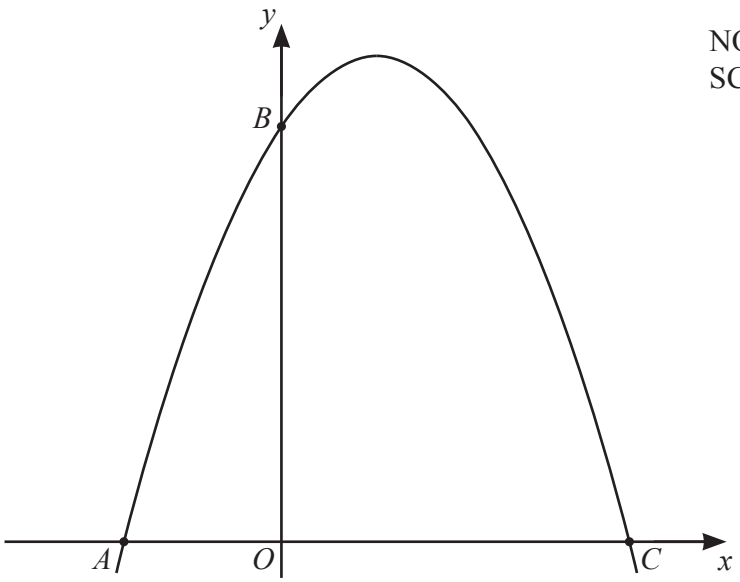
**(ii)** Solve $13x^2 - 620x - 3000 = 0$ to find the speed Antonio travels for the first 100 km of the journey.
You must show all your working and give your answer correct to 1 decimal place.

View solution

..... km/h [3]

© UCLES 2023

**11**




NOT TO SCALE

The diagram shows a sketch of $y = 18 + 5x - 2x^2$.

**(a)** Find the coordinates of the points $A$, $B$ and $C$.

View solution

$A$ ( ..... , ..... )

$B$ ( ..... , ..... )

$C$ ( ..... , ..... ) [4]

**(b)** Differentiate $18 + 5x - 2x^2$.

View solution

..... [2]

**(c)** Find the coordinates of the point on $y = 18 + 5x - 2x^2$ where the gradient is 17.

View solution

( ..... , ..... ) [3]

© UCLES 2023

**BLANK PAGE**

**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 Cambridge Assessment. Cambridge Assessment is the brand name of the University of Cambridge Local Examinations Syndicate (UCLES), which is a department of the University of Cambridge.

© UCLES 2023