Cambridge Assessment International Education

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3494015946

CAMBRIDGE INTERNATIONAL MATHEMATICS **0607/33**

Paper 3 (Core) **October/November 2022**

1 hour 45 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 π, use your calculator value.

INFORMATION

- The total mark for this paper is 96.
- The number of marks for each question or part question is shown in brackets [ ].

This document has **16** pages.

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[Turn over

Formula List

Area, A, of triangle, base b, height h.	$A = \frac{1}{2}bh$
Area, A, of circle, radius r.	$A = \pi r^2$
Circumference, C, of circle, radius r.	$C = 2\pi r$
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 prism, cross-sectional area A, length l.	$V = Al$
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.	$V = \frac{4}{3}\pi r^3$

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Answer **all** the questions.

1 **(a)** Write the two missing terms in this sequence.

40 33 26 ..... 12 ..... −2 [2]

(b) Work out.

(i) $256 - 31 \times 68$

..... [1]

(ii) $4^3 - 4^2$

..... [1]

(c) Find the value of $\sqrt[3]{105}$.
Give your answer correct to 4 significant figures.

..... [2]

(d) Write $\frac{2}{7}$ as a percentage.
Give your answer correct to 3 decimal places.

.....% [2]

(e) Find 24% of \$6.50 .

\$ ..... [2]

(f) Write $5 \times 5 \times 5 \times 5 \times 5 \times 5$ as a power of 5.

..... [1]

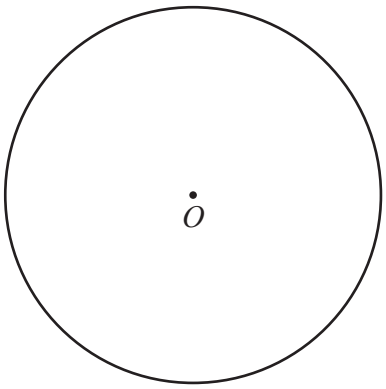
(g) Work out $3.1 \times 10^5 + 2.6 \times 10^4$.
Give your answer in standard form.

..... [2]

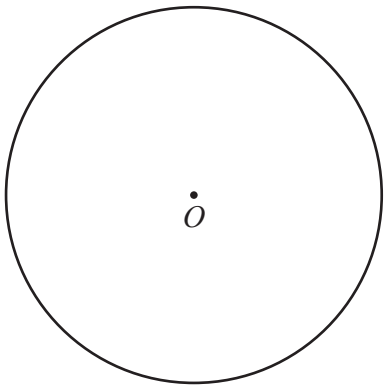
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2 **(a)** Each diagram shows a circle, centre O.

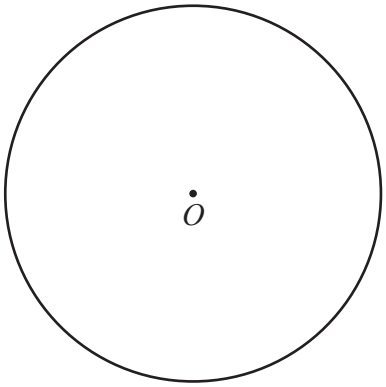
Complete each diagram with a correct straight line.



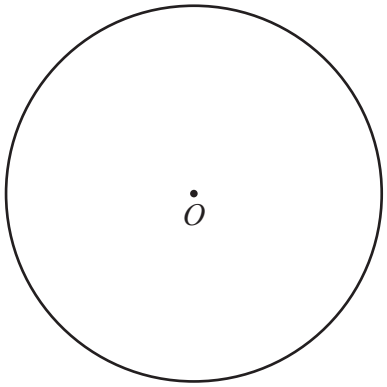
Radius



Chord



Diameter



Tangent

[4]

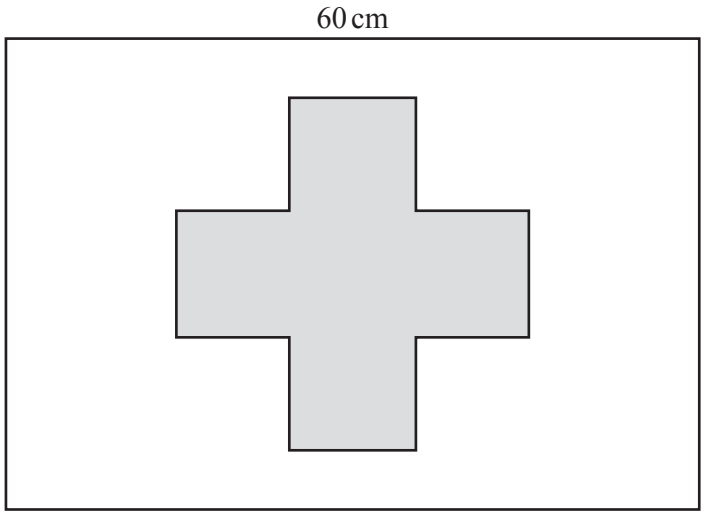
(b) A circle has radius 4 cm.

Work out the circumference of this circle.

..... cm [2]

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3



NOT TO SCALE

A flag measures 60 cm by 40 cm.
In the centre of the flag is a shaded cross with all sides 10 cm.
All the angles are right angles.

(a) Work out the area of the cross.

..... cm^2 [2]

(b) Find the area of the cross as a percentage of the total area of the flag.

.....% [2]

(c) Write down the order of rotational symmetry of the flag.

..... [1]

(d) Draw all the lines of symmetry of the flag. [2]

4 **(a)** A teacher buys a packet of raisins for each of her 18 mathematics students.
Each student counts the number of raisins in their packet.

28	29	28	30	28	28	29	27	29
29	30	29	28	27	27	30	28	30

(i) Complete the frequency table.

Number of raisins	Frequency
27	
28	
29	
30	

[2]

(ii) Write down the mode.

..... [1]

(iii) Work out the mean number of raisins in a packet.

..... [2]

(iv) One of these 18 students is chosen at random.

Find the probability that there were 29 raisins in their packet.

..... [1]

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(b) Another teacher buys a packet of raisins for each of his 24 mathematics students. The numbers of raisins in these packets are shown in the table.

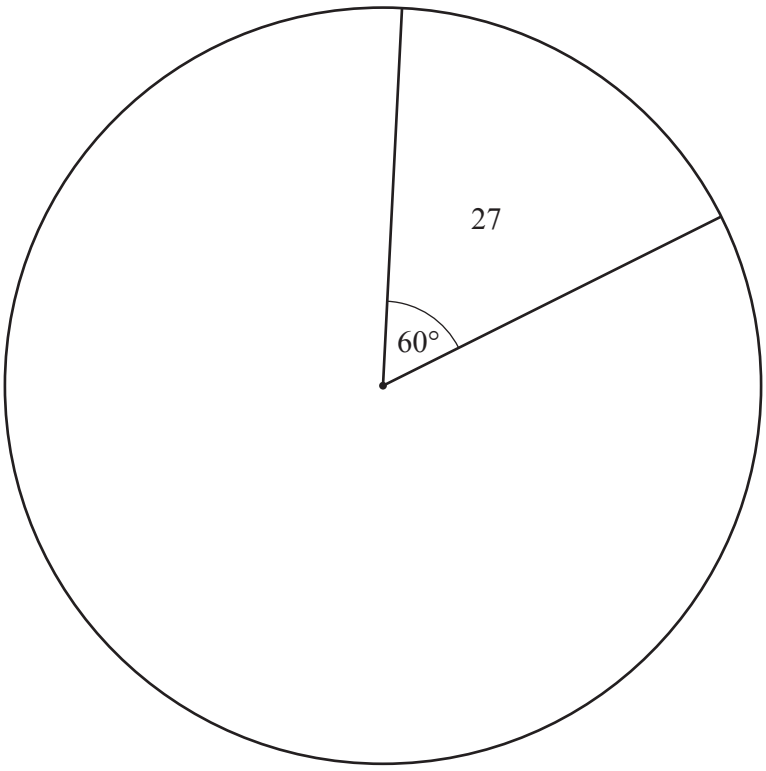
Number of raisins	Frequency
27	4
28	7
29	8
30	5

The teacher asks his students to draw a pie chart to show the information in the table.

(i) Show that the sector angle for 27 raisins is 60°.

[2]

(ii) Complete the pie chart to show the numbers of raisins in these packets.



[3]

5 Maisy is a plumber.

(a) Maisy buys 5 pipes that each cost \$13 and 2 taps that each cost \$32.

Work out the total she pays.

\$ ..... [2]

(b) Maisy has a fixed call-out charge of \$25 plus a charge of \$35 for each hour, h, that she works. The total charge is \$$T$.

(i) Write a formula for T in terms of h.

..... [2]

(ii) Work out the total charge when Maisy works for 3 hours.

\$ ..... [2]

(iii) Giselle pays Maisy a total charge of \$200.

Work out the number of hours that Maisy worked.

..... [2]

(c) Maisy invests \$3000 for 4 years at a rate of 2% per year compound interest.

Calculate the amount of interest she receives at the end of the 4 years.

\$ ..... [3]

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6 **(a)** Simplify.

(i) $3t-2t+t$

..... [1]

(ii) $6x-y-3x+2y$

..... [2]

(b) Solve.

(i) $\frac{x}{8}=2$

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

(ii) $x+17=16$

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

(iii) $25-2x>4$

..... [2]

(c) Write as a single fraction in its simplest form.

(i) $\frac{2a}{7}-\frac{2a}{21}$

..... [2]

(ii) $\frac{9p^2}{8}\times\frac{4}{3p}$

..... [2]

7 The frequency table shows the length of time, t seconds, of 60 telephone calls answered by a doctor's receptionist.

Time (t seconds)	Frequency
$0 < t \leqslant 15$	2
$15 < t \leqslant 30$	4
$30 < t \leqslant 45$	9
$45 < t \leqslant 60$	12
$60 < t \leqslant 75$	15
$75 < t \leqslant 90$	12
$90 < t \leqslant 105$	4
$105 < t \leqslant 120$	2

(a) Write down the modal class.

..... $< t \leqslant$ ..... [1]

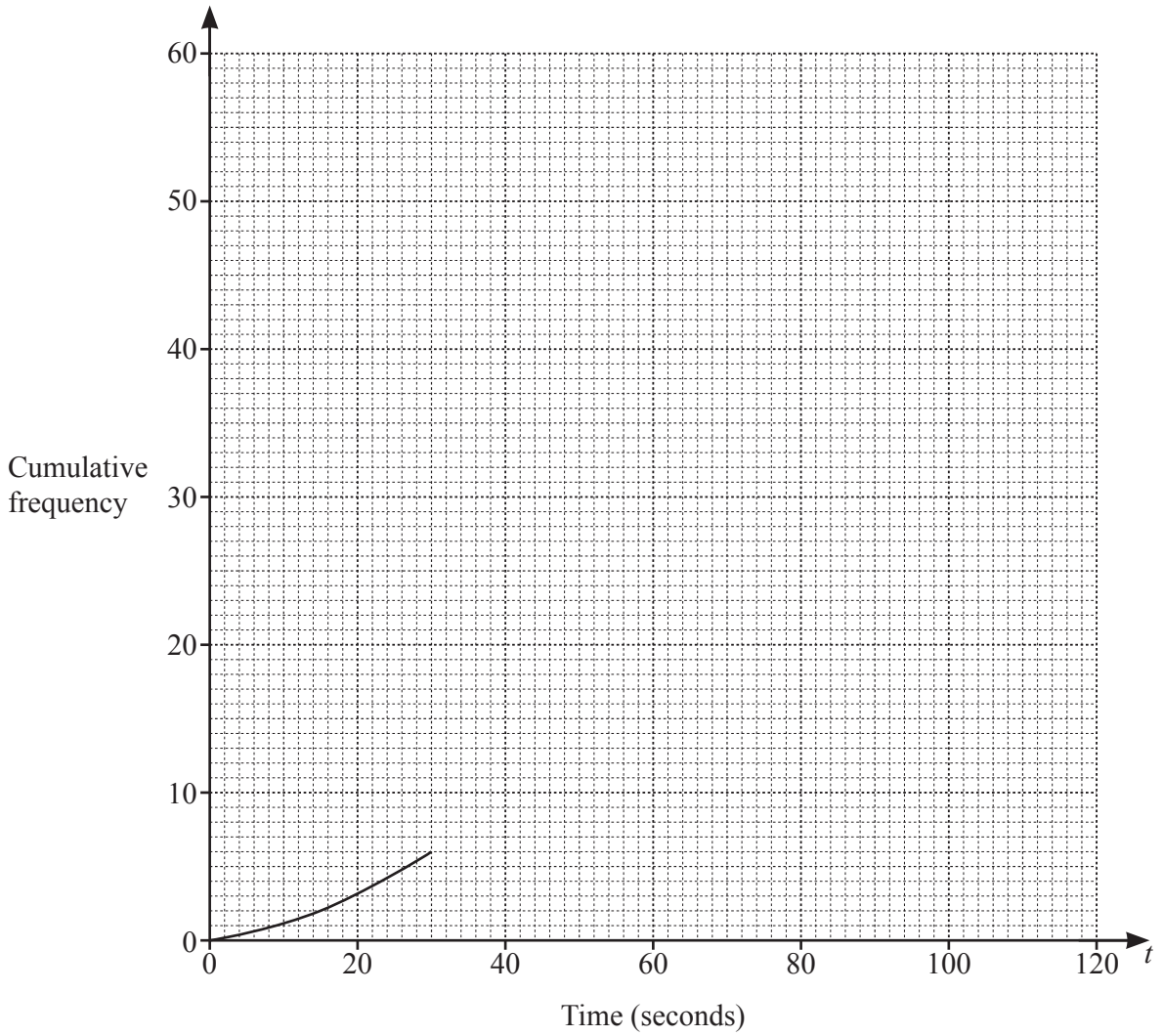
(b) Complete the cumulative frequency table.

Time (t seconds)	Cumulative frequency
$t \leqslant 15$	2
$t \leqslant 30$	6
$t \leqslant 45$	
$t \leqslant 60$	
$t \leqslant 75$	
$t \leqslant 90$	
$t \leqslant 105$	
$t \leqslant 120$	60

[1]

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(c) Complete the cumulative frequency curve.



[3]

(d) Use your curve to find

(i) the median,

..... s [1]

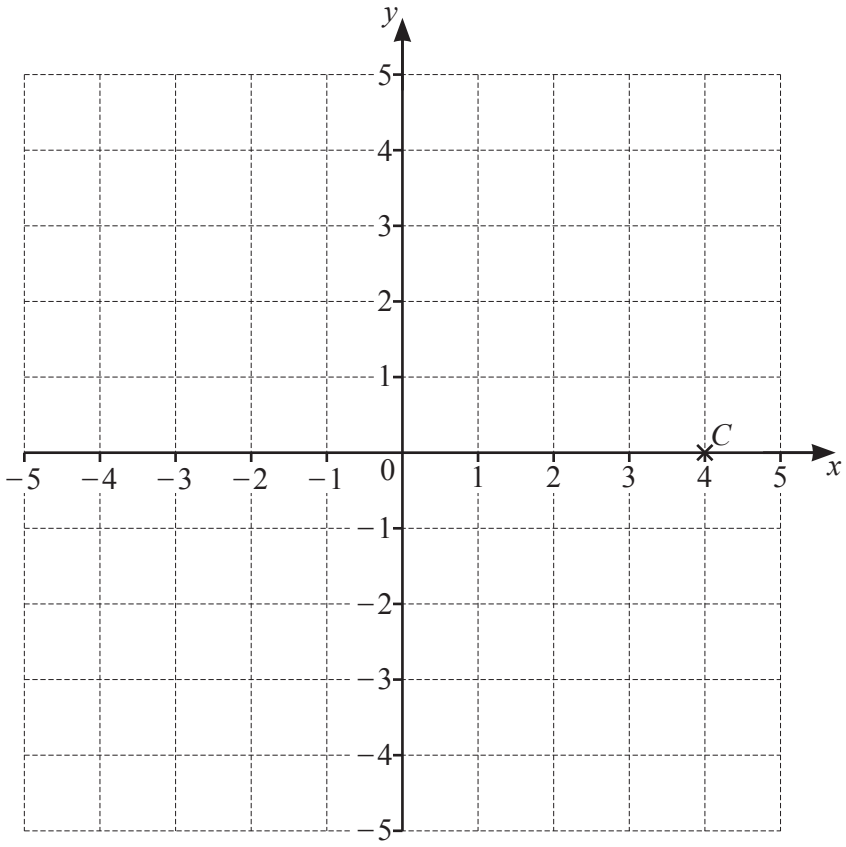
(ii) the lower quartile,

..... s [1]

(iii) the number of calls that lasted more than 80 seconds.

..... [2]

8



The diagram shows a $1\,\text{cm}^2$ grid with the point C plotted.

(a) On the grid, plot the points $A(-4, 2)$ and $B(2, 4)$. [2]

(b) Join the points A, B and C to form a triangle and write down the mathematical name of triangle ABC.

..... [1]

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(c) Find

(i) the coordinates of the mid-point of AB,

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

(ii) the gradient of the line AB.

..... [2]

(d) Use Pythagoras' Theorem to calculate the length of AB.

..... [2]

(e) Reflect triangle ABC in the x-axis. [1]

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9 **(a)** $\mathsf{U} = \{10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21\}$
A is the set of odd numbers.
B is the set of multiples of 3.

(i) List the elements of the following sets.

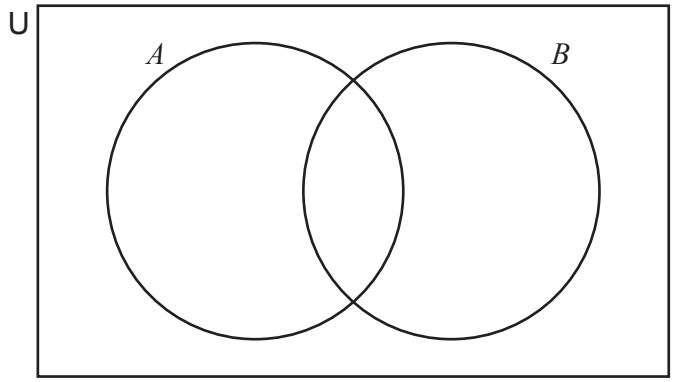
(a) A ..... [1]

(b) B ..... [1]

(c) $A \cap B$

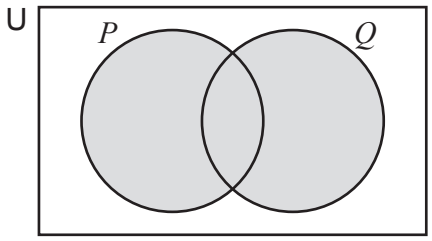
..... [1]

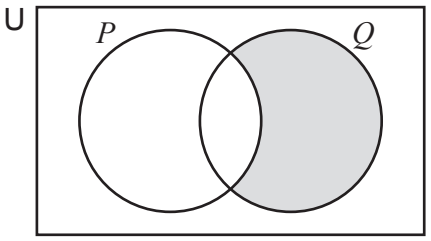
(ii) Complete the Venn diagram by writing each element in the correct subset.



[2]

(b) Use set notation to describe the region shaded in each Venn diagram.

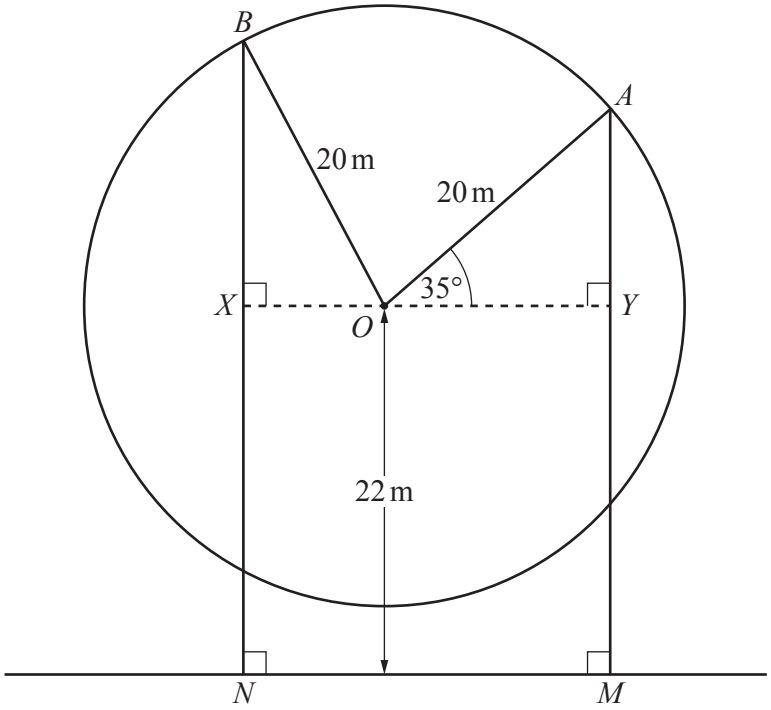




....

[2]

10



NOT TO SCALE

The diagram shows a circular Big Wheel with radius 20 metres.
The centre, O, of the Big Wheel is 22 metres vertically above horizontal ground.

A and B mark the positions of two seats on the Big Wheel.
OA makes an angle of 35° with the horizontal line XOY.

(a) Find the vertical distance, AM, of A above the ground.

$AM =$ ..... m [3]

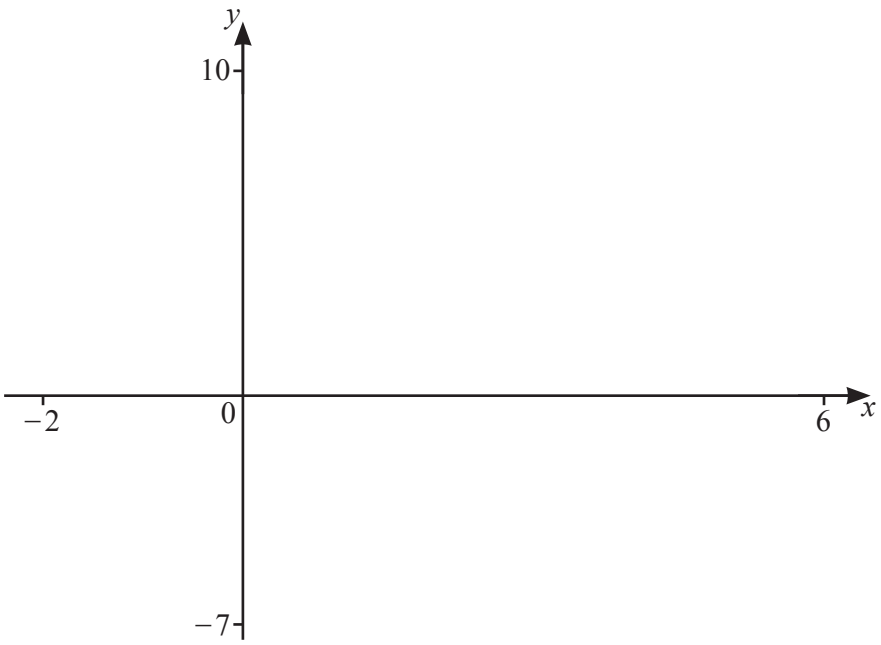
(b) The vertical distance of B above the ground, BN, is 38 metres.

Work out the size of angle XBO.

Angle $XBO =$ ..... [3]

Question 11 is printed on the next page.

11



(a) On the diagram, sketch the graph of $y = -x^2 + 4x + 5$ for $-2 \leqslant x \leqslant 6$. [2]

(b) Find the coordinates of the points where the graph crosses the x-axis.

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

(c) Find the coordinates of the point where the graph crosses the y-axis.

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

(d) Find the coordinates of the local maximum.

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

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