



Cambridge IGCSE™

CANDIDATE
NAME

| |
|--|
| |
|--|

CENTRE
NUMBER

| | | | | |
|--|--|--|--|--|
| | | | | |
|--|--|--|--|--|

CANDIDATE
NUMBER

| | | | |
|--|--|--|--|
| | | | |
|--|--|--|--|



CAMBRIDGE INTERNATIONAL MATHEMATICS

0607/42

Paper 4 (Extended)

February/March 2022

2 hours 15 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 120.
- The number of marks for each question or part question is shown in brackets [].

This document has **20** pages. Any blank pages are indicated.

Formula List

For the equation $ax^2 + bx + c = 0$ $x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$

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 . $A = \pi rl$

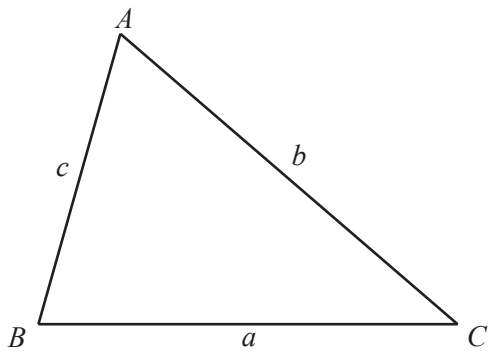
Curved surface area, A , of sphere of radius r . $A = 4\pi r^2$

Volume, V , of 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 . $V = \frac{4}{3}\pi r^3$



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

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

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

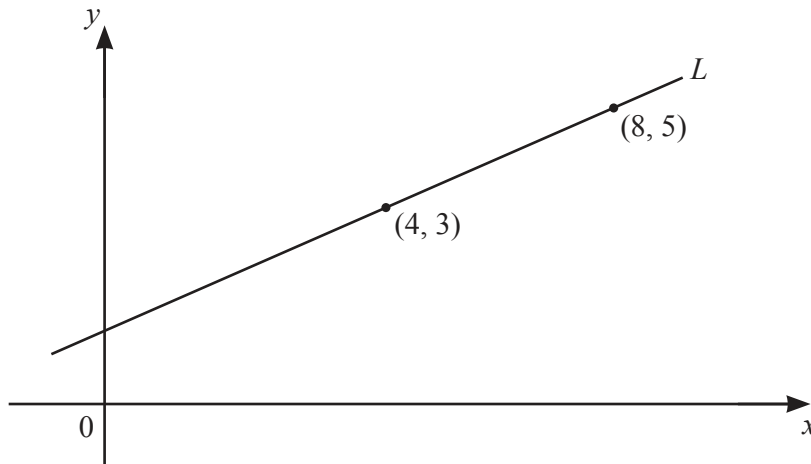
Answer **all** the questions.

- 1 (a) Find the gradient and y -intercept of the line with equation $3x + 4y = 24$.

Gradient =

y -intercept = [3]

(b)



NOT TO
SCALE

The diagram shows line L and the coordinates of two points on the line.

- (i) Show that the equation of line L is $2y - x = 2$.

[3]

- (ii) Find the equation of the line parallel to L that passes through the point $(0, 7)$.
Give your answer in the form $y = mx + c$.

$y =$ [2]

2 (a) Find 12 kg as a percentage of 80 kg.

.....% [1]

(b) Find 19% of \$250.

\$ [2]

(c) Xavier invests \$500 at a rate of 1.5% per year simple interest.
At the end of y years, the value of Xavier's investment is \$612.50 .

Find the value of y .

$y =$ [3]

(d) Each year the value of a car decreases by 12% of its value at the beginning of that year. The original value of the car is \$20 000.

- (i) Calculate the value of the car at the end of 3 years.
Give your answer correct to the nearest dollar.

\$ [3]

- (ii) Find the number of complete years for the value of \$20 000 to decrease until it is first below \$1000.

..... [4]

(e) Each year the value of another car decreases by $r\%$ of its value at the beginning of that year. At the end of 10 years, the value has decreased from \$12 000 to \$4673.

Find the value of r .

$r =$ [3]

- 3 (a) The table shows the coursework grades for 20 students.

| | | | | | |
|-----------|---|---|---|---|---|
| Grade | 3 | 4 | 5 | 6 | 7 |
| Frequency | 1 | 3 | 6 | 2 | 8 |

Find

- (i) the mode, [1]
- (ii) the range, [1]
- (iii) the median, [1]
- (iv) the lower quartile. [1]

- (b) The table shows some information about the heights, h cm, of 100 bushes.

| | | | |
|------------------|--------------------|--------------------|--------------------|
| Height (h cm) | $100 < h \leq 110$ | $110 < h \leq 115$ | $115 < h \leq 130$ |
| Frequency | 18 | 37 | 45 |

Calculate an estimate of the mean height.

..... cm [2]

- (c) The table shows some information about the times, t minutes, taken by some students to read a magazine.

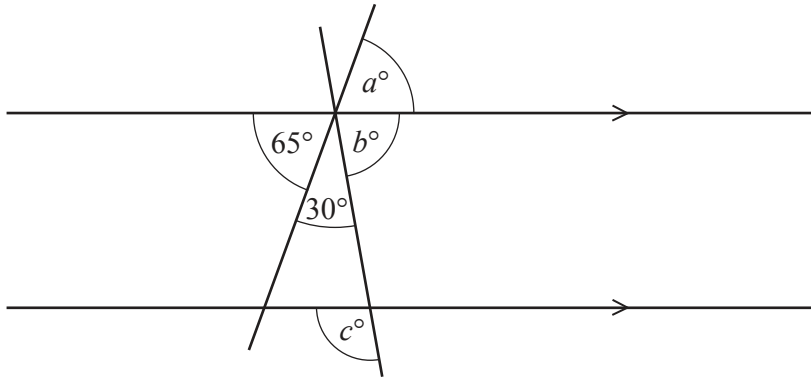
| | | | | |
|---------------------|-----------------|------------------|------------------|------------------|
| Time (t minutes) | $0 < t \leq 10$ | $10 < t \leq 20$ | $20 < t \leq 30$ | $30 < t \leq 40$ |
| Frequency | 3 | 11 | n | 19 |

When using mid-interval values, an estimate of the mean value of t is 25.4 .

Find the value of n .

$n =$ [4]

4 (a)



NOT TO SCALE

The diagram shows two straight lines crossing two parallel lines.

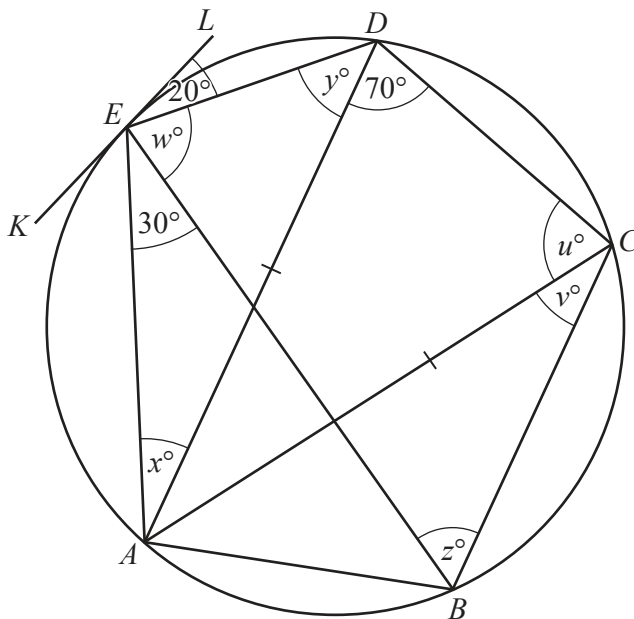
Find the values of a , b and c .

$a = \dots\dots\dots$

$b = \dots\dots\dots$

$c = \dots\dots\dots$ [3]

(b)



NOT TO SCALE

A, B, C, D and E are points on the circle.

KL is a tangent to the circle at E .

$AC = AD$.

Find the values of u , v , w , x , y and z .

$u = \dots\dots\dots$ $x = \dots\dots\dots$

$v = \dots\dots\dots$ $y = \dots\dots\dots$

$w = \dots\dots\dots$ $z = \dots\dots\dots$ [6]

5 (a) (i) Expand and simplify $(2x+3)^2$.

..... [2]

(ii) The equation $4x^2 + 12x + 5 = 0$ can be written as $(2x+3)^2 = k$.

Find the value of k .

$k =$ [1]

(iii) Use your answer to **part(ii)** to solve the equation $4x^2 + 12x + 5 = 0$.

$x =$ or $x =$ [2]

- (b) x varies inversely as the square root of $(w - 1)$.
When $w = 10$, $x = 2$.

(i) Find x in terms of w .

$$x = \dots\dots\dots [2]$$

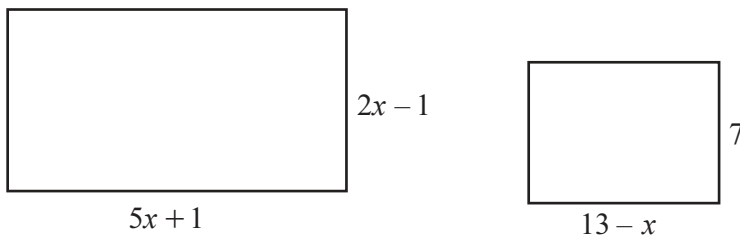
(ii) Find x when $w = 3.25$.

$$x = \dots\dots\dots [1]$$

(iii) Find w in terms of x .

$$w = \dots\dots\dots [3]$$

6 In this question all lengths are in centimetres.



NOT TO SCALE

The area of the larger rectangle is 84 cm^2 greater than the area of the smaller rectangle.

(a) Show that $5x^2 + 2x - 88 = 0$.

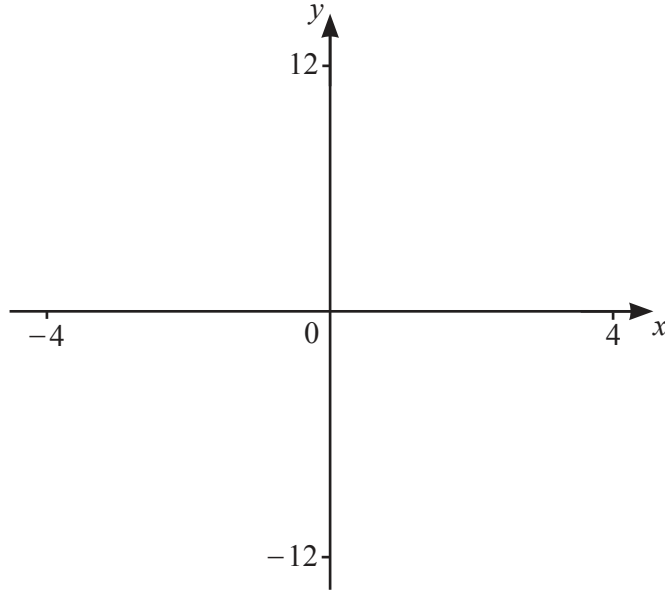
[4]

(b) Factorise $5x^2 + 2x - 88$.

..... [2]

(c) Find the area of the smaller rectangle.

..... cm^2 [2]



$f(x) = |4 - x^2|$ for $-4 \leq x \leq 4$

(a) On the diagram, sketch the graph of $y = f(x)$. [2]

(b) Write down the zeros of $f(x)$.

..... [2]

(c) Write down the coordinates of the local maximum.

(.....,) [1]

(d) The equation $|4 - x^2| = k$ has 4 solutions and k is an integer.

Write down a possible value of k .

$k =$ [1]

(e) (i) On the diagram, sketch the graph of $y = 2x$. [1]

(ii) Solve the equation $|4 - x^2| = 2x$.

..... [2]

(iii) On the diagram, shade the regions where $y \geq 0$, $y \leq 2x$ and $y \leq |4 - x^2|$. [2]

8 $f(x) = 2x + 1$ $g(x) = 3 - 2x$ $h(x) = \log(x + 1)$

(a) Find the value of

(i) $f(12)$,

..... [1]

(ii) $g(f(12))$.

..... [1]

(b) Find the value of x when $f(x) = g(x)$.

$x =$ [2]

(c) Find $f(g(x))$, giving your answer in its simplest form.

..... [2]

(d) Find $g^{-1}(x)$.

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

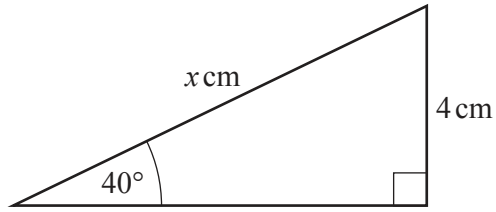
(e) Find x when $h(x) = f(0.5)$.

$x = \dots\dots\dots$ [2]

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

$h^{-1}(x) = \dots\dots\dots$ [2]

9 (a)

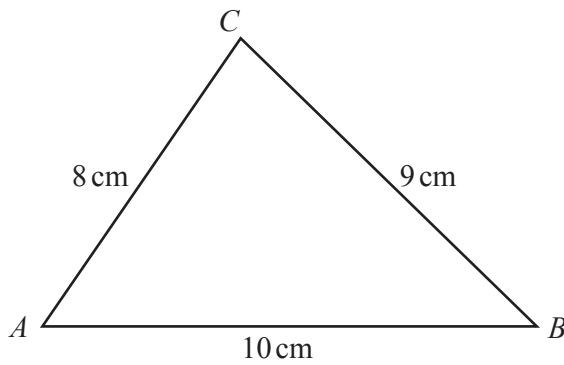


NOT TO SCALE

Calculate the value of x .

$x = \dots\dots\dots$ [3]

(b)



NOT TO SCALE

(i) Calculate angle ABC .

Angle $ABC = \dots\dots\dots$ [3]

(ii) T is the point on AB that is the shortest distance from C .

Calculate BT .

$BT = \dots\dots\dots$ cm [3]

(c) Another triangle PQR has $QR = 12$ cm, $PR = 7$ cm and angle $PQR = 35^\circ$.

Calculate the difference between the two possible values of angle QPR .

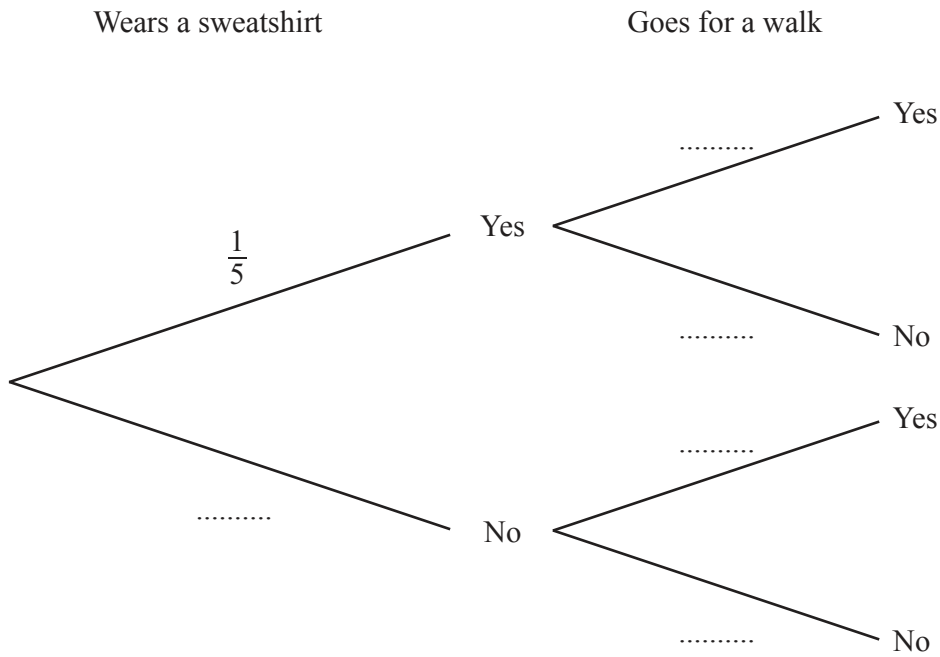
..... [5]

10 When Zena wears a sweatshirt, the probability that she goes for a walk is $\frac{7}{10}$.

When Zena does not wear a sweatshirt, the probability that she goes for a walk is $\frac{9}{10}$.

On any day, the probability that she wears a sweatshirt is $\frac{1}{5}$.

(a) Complete the tree diagram.



[3]

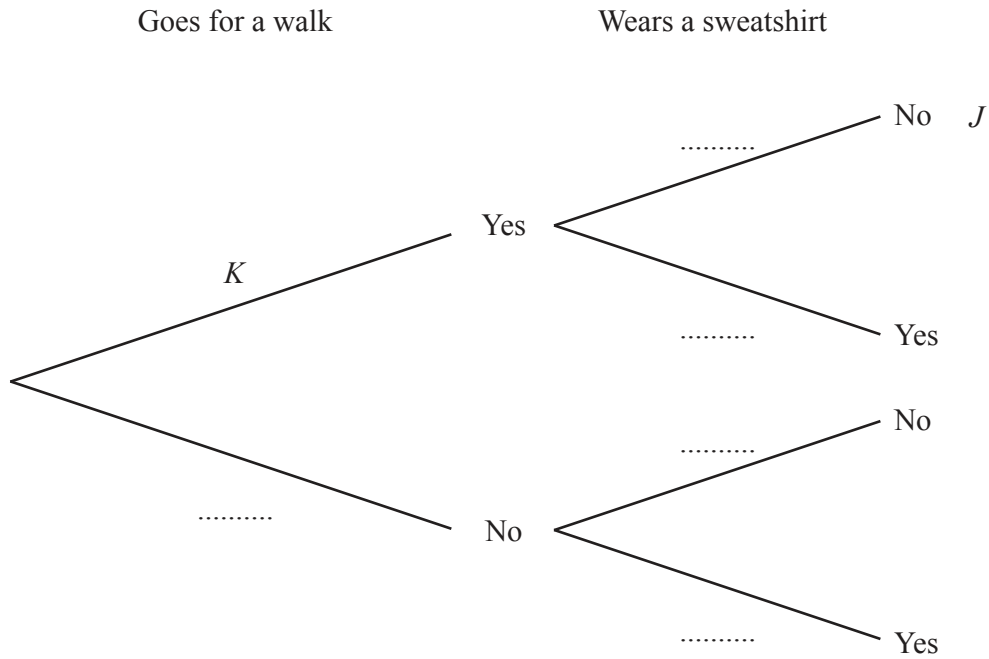
(b) (i) Find the probability that on one day Zena does not wear a sweatshirt and she goes for a walk.

..... [2]

(ii) Find the probability that on one day Zena goes for a walk.

..... [2]

(c) In the tree diagram below, the value of J is the answer to **part (b)(i)** and the value of K is the answer to **part (b)(ii)**.



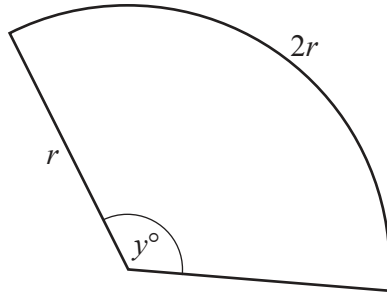
(i) Find the probability that Zena does not wear a sweatshirt when she goes for a walk.

..... [2]

(ii) Complete the tree diagram above.

[3]

11 (a)

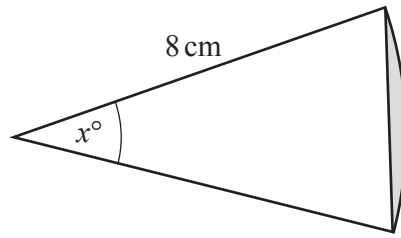
NOT TO
SCALE

The diagram shows a sector of a circle with radius r and angle y° .
The length of the arc of the sector is $2r$.

Calculate the value of y .

$y = \dots\dots\dots$ [3]

(b)



NOT TO SCALE

The diagram shows a sector of a circle with radius 8 cm and angle x° . The area of the shaded segment is $A \text{ cm}^2$.

(i) Show that $A = \frac{8x}{45}\pi - 32 \sin x$.

[2]

(ii) Find the value of A when $x = 90$.

..... [1]

(iii) By sketching the graph of $A = \frac{8x}{45}\pi - 32 \sin x$, find the value of x when $A = 5.5$.



$x =$ [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 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.