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CAMBRIDGE INTERNATIONAL MATHEMATICS **0607/31**

Paper 3 (Core) **October/November 2024**

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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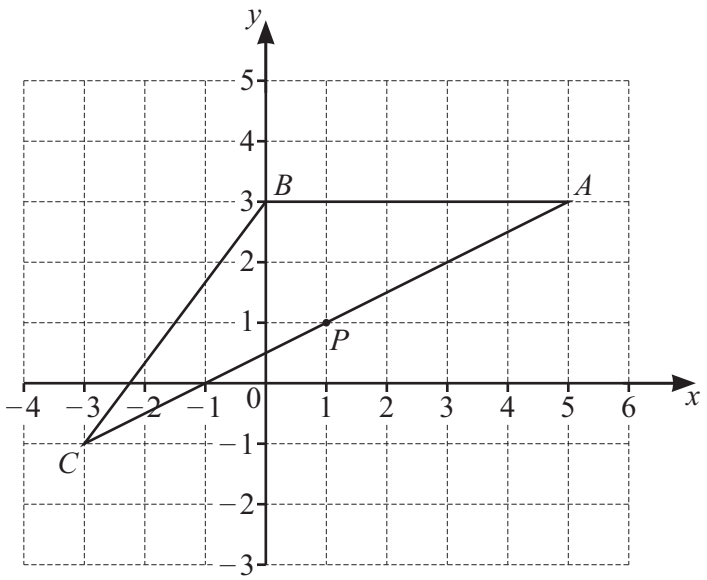
Formula List

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 down the coordinates of the points A, B and C.

$A = (\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots)$

$B = (\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots)$

$C = (\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots)$ [3]

(b) Point P is the mid-point of the line AC.
P is also the mid-point of the line BD.

(i) On the grid, plot point D. [1]

(ii) Write down the coordinates of point D.

$D = (\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots)$ [1]

(c) Join, with straight lines, A to D and C to D.

(i) Write down the number of lines of symmetry of quadrilateral $ABCD$.

..... [1]

(ii) Write down the order of rotational symmetry of quadrilateral $ABCD$.

..... [1]

(iii) Write down the mathematical name of quadrilateral $ABCD$.

..... [1]

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2 A technician repairs 10 computers.
He records the time he takes to complete each repair.
The times, in minutes, are shown below.

74	25	54	45	60
32	62	59	56	43

(a) Find the mean time taken.

..... minutes [1]

(b) Complete the stem-and-leaf diagram for the times.

2	
3	
4	
5	
6	
7	

Key: .....|..... means ..... minutes [3]

(c) Find the median time.

..... minutes [1]

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(d) One of the times is chosen at random.

Find the probability that this time is more than 1 hour.
Give your answer as a fraction in its simplest form.

..... [2]

(e) A pie chart is drawn to show the times.

Work out the angle for the sector representing less than 30 minutes.

..... [2]

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3 Nina takes part in a sponsored walk.
She walks 29 km.

(a) Her mother, grandmother and brother all sponsor her for each kilometre she walks.

Complete the table.

Sponsor	Distance walked (km)	Amount for each km walked	Amount raised
Mother	29	\$3	\$
Grandmother	29	\$1.75	\$
Brother	29	50 cents	\$
	Total amount raised		\$

[4]

(b) Nina collects \$575 in total from all her sponsors.
She divides the money between three charities, A, B and C, in this ratio.

$$A : B : C = 10 : 8 : 7$$

Work out how much each charity receives.

A \$ .....

B \$ .....

C \$ ..... [3]

(c) Nina walked the 29 km in 6 hours 45 minutes.

Work out Nina's average speed in kilometres per hour.
Give your answer correct to 2 significant figures.

..... km/h [3]

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4 **(a)** These are the first four terms of a sequence.

2 6 10 14

(i) Work out the next three terms.

.... [2]

(ii) Write down the rule for continuing this sequence.

..... [1]

(b) Here is a different sequence with the 1st and the 6th terms missing.

… 25 18 11 4 …

Find the 1st term and the 6th term of this sequence.

1st term = ...

6th term = ... [2]

(c) The nth term of another sequence is $2n^2$.

Find the first three terms of this sequence.

.... [2]

(d) These are the first four terms of a different sequence.

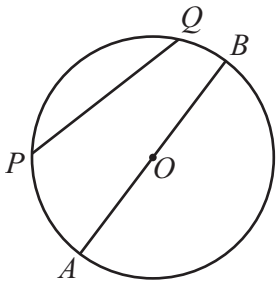
8 13 18 23

Find an expression for the nth term.

..... [2]

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5 (a)



A, B, P and Q lie on a circle, centre O.
AOB is a straight line.

(i) Write down the mathematical name for the line AB.

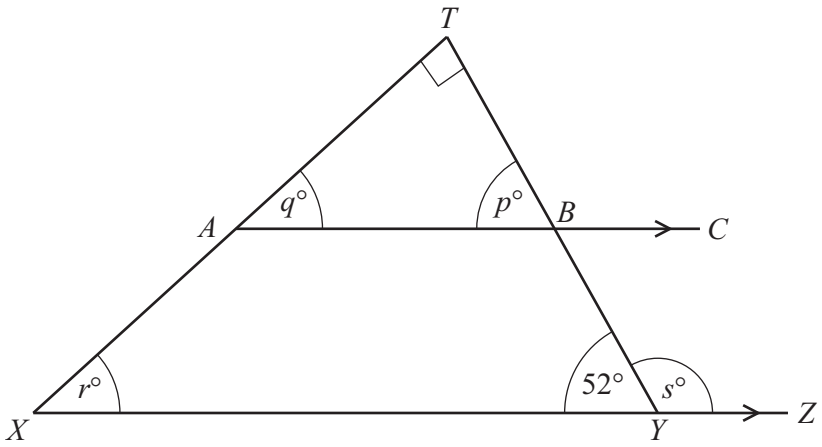
..... [1]

(ii) Write down the mathematical name for the line PQ.

..... [1]

(iii) On the diagram, draw a tangent to the circle. [1]

(b)



NOT TO SCALE

In the diagram, XAT and YBT are straight lines.
ABC is parallel to XYZ.

Find the values of p, q, r and s.

$p =$ .....

$q =$ .....

$r =$ .....

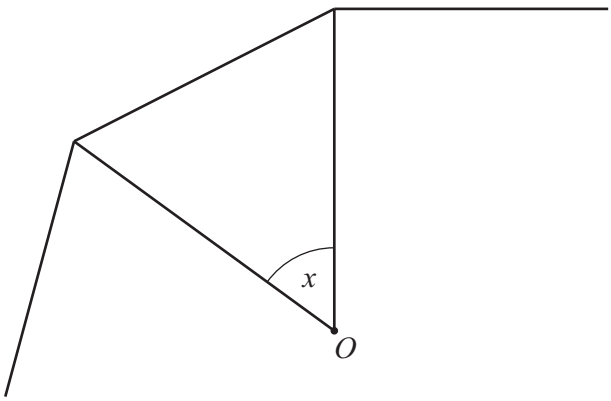
$s =$ ..... [4]

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(c) Find the size of one interior angle of a regular polygon with 9 sides.

..... [3]

(d) The diagram shows part of a regular polygon with centre O.



NOT TO SCALE

Show that angle x cannot be 50°.

.....

..... [2]

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6 **(a)** The price of a printer is \$120.
In a sale, the price is reduced by \$42.

(i) Work out the price of the printer in the sale.

\$ ..... [1]

(ii) Work out \$42 as a percentage of \$120.

..... % [1]

(b) Sajid sees the same computer advertised in two shops.

SHOP A
'Stella' computer
Was \$930
In sale, reduced by 40%

SHOP B
'Stella' computer
Was \$930
In sale, reduced by $\frac{3}{8}$

Work out which shop is cheaper and by how much.

Shop ..... by \$ ..... [5]

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7 **(a)** Complete this statement using one of $<$, $=$ or $>$.

17 25

[1]

(b) Simplify fully.

$5x - 4x + 3x$

..... [1]

(c) $A = 6r$

Find A when $r = 2.5$.

$A =$ ..... [1]

(d) Solve.

(i) $\frac{x}{4} = 8$

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

(ii) $6(2x - 7) = 3$

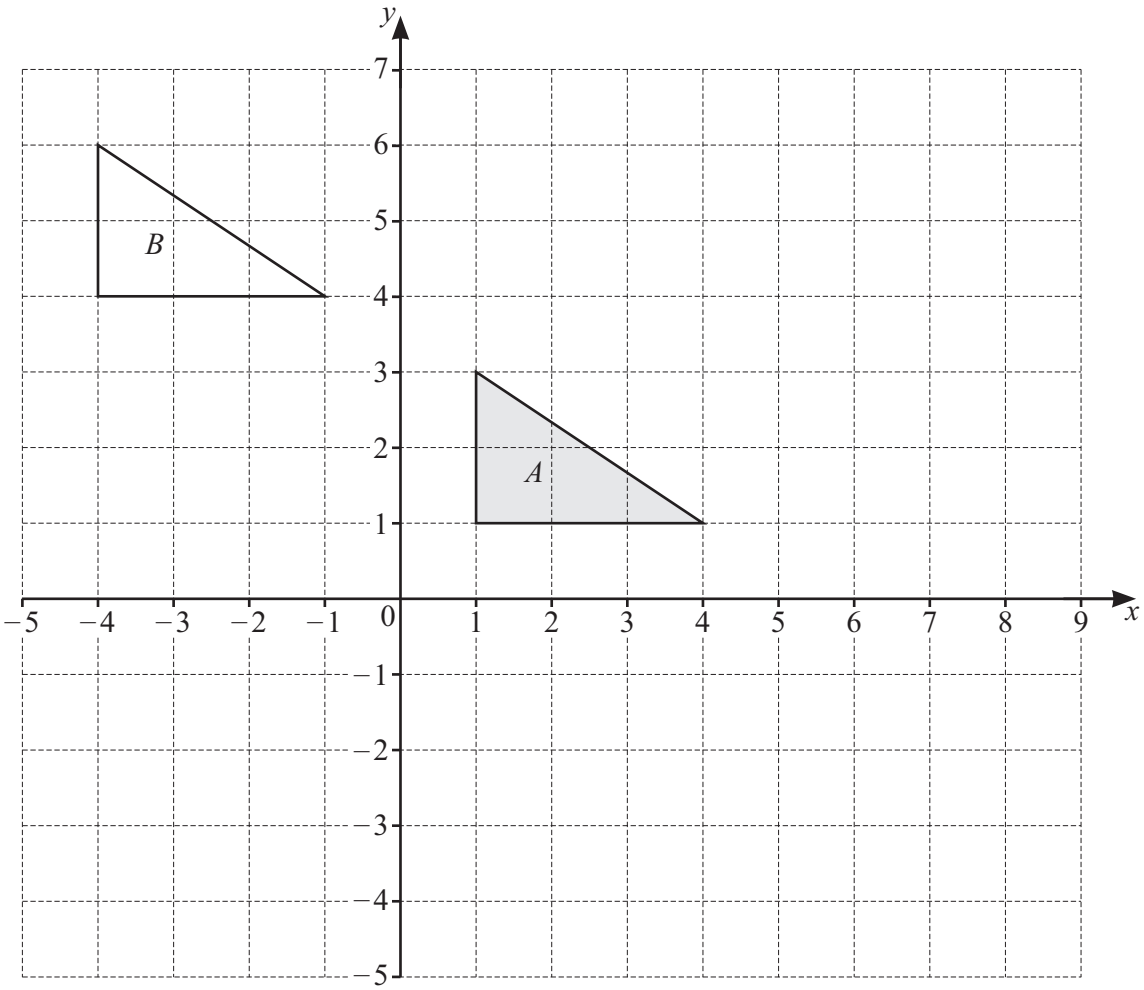
$x =$ ..... [3]

(e) Rearrange this formula to make t the subject.

$v = 2t + 20$

$t =$ ..... [2]

8



(a) Triangle A is drawn on a 1 cm square grid.

(i) Work out the area of triangle A.

..... cm^2 [2]

(ii) Use Pythagoras' Theorem to help you work out the perimeter of triangle A.

..... cm [3]

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(b) Describe fully the **single** transformation which maps triangle *A* onto triangle *B*.

.....

..... [2]

(c) Rotate triangle *A* by 90° clockwise about (0, 0).
Label the image *C*. [2]

(d) Enlarge triangle *A* by scale factor 2 from centre (0, 0).
Label the image *D*. [2]

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9 **(a)** Uma is paid $35 500 per year.
She receives a pay increase of 7%.

Work out Uma's new pay.

$ ..... [2]

(b) Uma invests $2500 at a rate of 3% per year simple interest.

Work out the value of her investment at the end of 4 years.

$ ..... [3]

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10 A shop sells computers and printers.
The probability that:

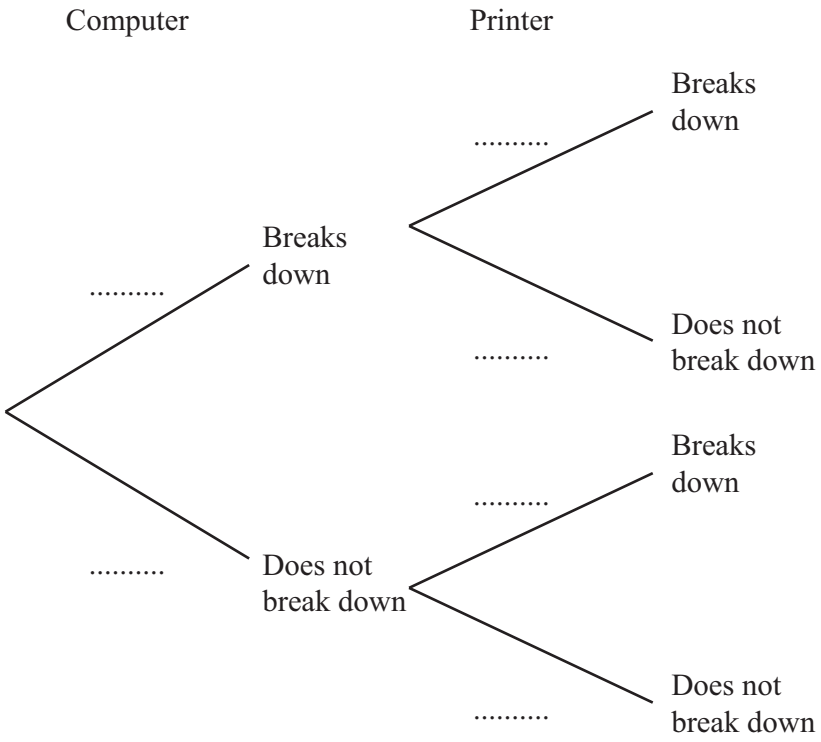
- a computer breaks down in the first year is 0.10
- a printer breaks down in the first year is 0.15 .

(a) The shop sells 420 printers.

Work out the number of these printers that are expected to break down in the first year.

..... [2]

(b) Complete the tree diagram.



[3]

(c) Orla buys a computer and a printer.

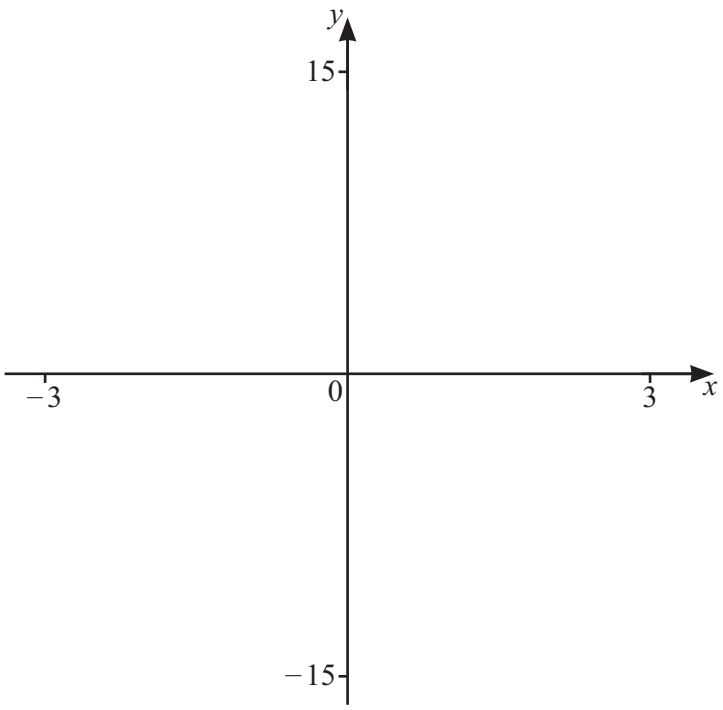
Find the probability that the computer does not break down but the printer does break down in the first year.

..... [2]

Question 11 is printed on the next page.

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11



(a) **(i)** On the diagram, sketch the graph of $y = \frac{5}{x}$ for values of x from -3 to 3. [2]

(ii) Write down the equation of each asymptote of $y = \frac{5}{x}$.

..... and ..... [2]

(b) On the diagram, sketch the graph of $y = 3x - 2$ for values of x from -3 to 3. [2]

(c) Find the coordinates of each point of intersection of $y = 3x - 2$ and $y = \frac{5}{x}$.

(..... , ...)

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

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