



CANDIDATE
NAME

--

CENTRE
NUMBER

--	--	--	--	--

CANDIDATE
NUMBER

--	--	--	--



0607/43

Paper 4 (Extended)

October/November 2022

2 hours 15 minutes

You must answer on the question paper.

You will need: Geometrical instruments

- 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.

- 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 . $A = \pi rl$

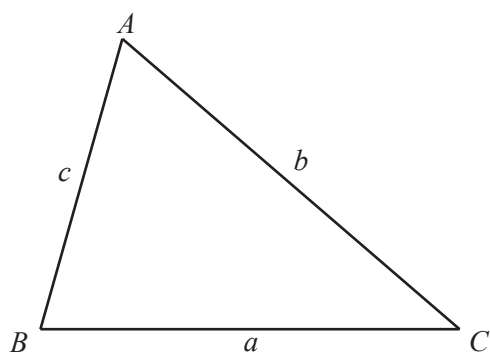
Curved surface area, A , of sphere of radius r . $A = 4\pi r^2$

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



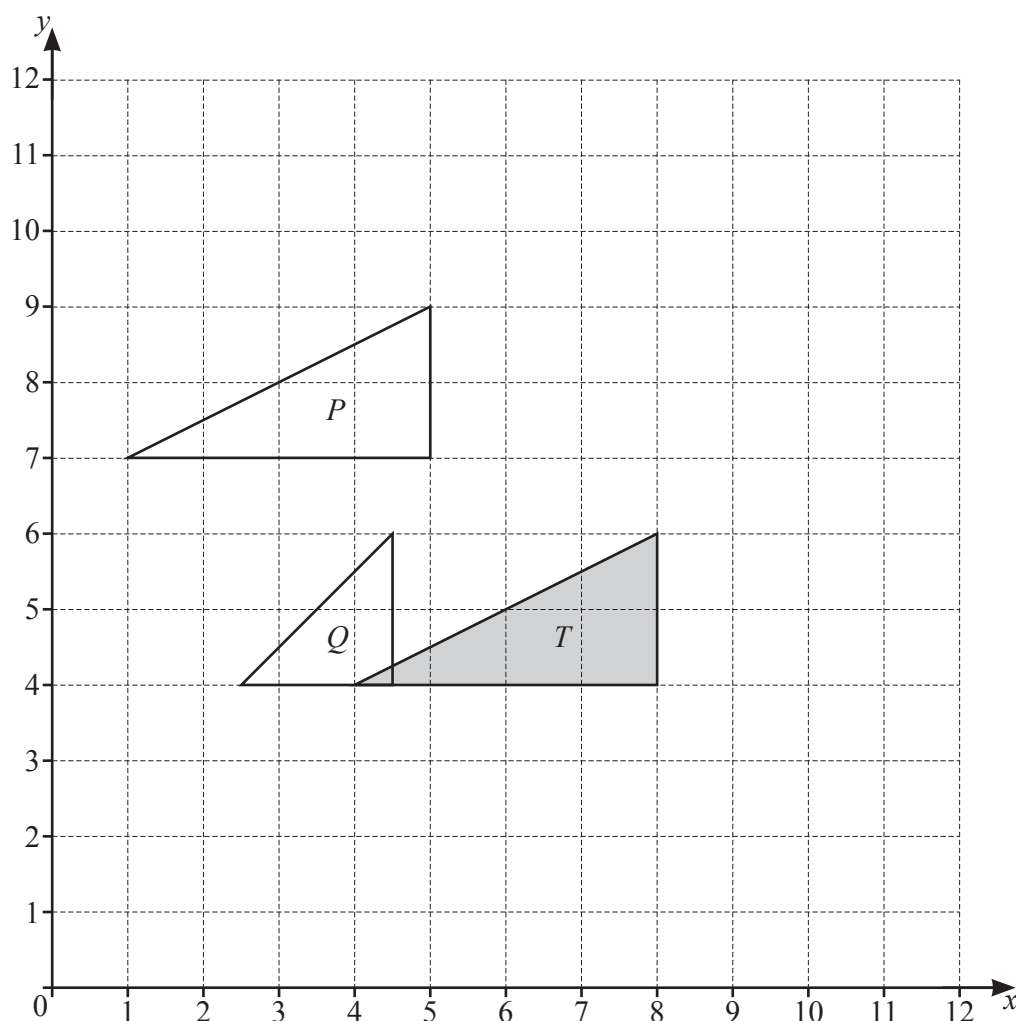
$$\frac{a}{\sin A} = \frac{b}{\sin B} = \frac{c}{\sin C}$$

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

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

Answer **all** the questions.

1



(a) Rotate triangle T through 90° clockwise about the point $(9, 6)$. [2]

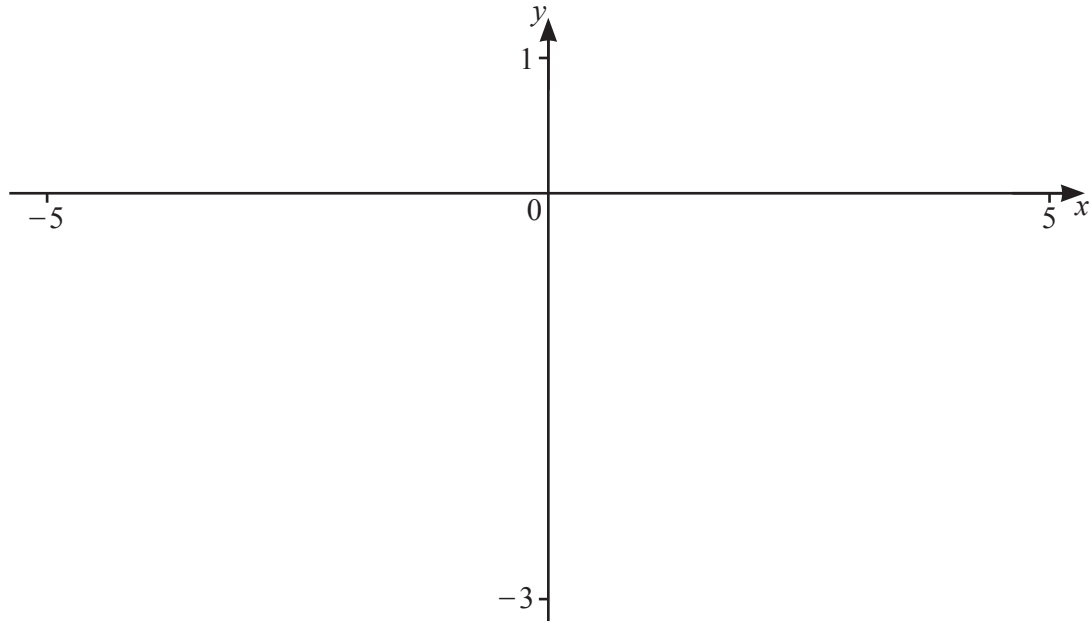
(b) Enlarge triangle T with scale factor $\frac{1}{2}$, centre $(0, 0)$. [2]

(c) Describe fully the **single** transformation that maps triangle T onto triangle P .

..... [2]

(d) Describe fully the **single** transformation that maps triangle T onto triangle Q .

..... [3]



$$f(x) = \frac{1}{x} - \frac{1}{x^2}$$

(a) On the diagram, sketch the graph of $y = f(x)$ for values of x between -5 and 5 . [2]

(b) Find $f(-2)$.

..... [1]

(c) Solve the equation $f(x) = 0$.

$x =$ [1]

(d) Find the maximum value of $f(x)$.

..... [1]

(e) Write down the equation of each asymptote.

..... [2]

- (f) (i) Solve the equation.

$$\frac{1}{x} - \frac{1}{x^2} = x^2 - 2$$

..... [3]

- (ii) The equation $\frac{1}{x} - \frac{1}{x^2} = x^2 - 2$ can be rearranged to the form $x^4 + ax^2 + bx + c = 0$.

Find the values of a , b and c .

$$a = \dots\dots\dots$$

$$b = \dots\dots\dots$$

$$c = \dots\dots\dots [2]$$

- 3 (a) Amira buys a magazine that costs $\$n$ and a book that costs $\$(2n + 5)$.
She pays with a \$20 note and receives \$1.62 change.

Find the cost of a magazine.

\$ [3]

- (b) The cost of a bar of chocolate is $\$x$ and the cost of a bag of sweets is $\$y$.

Bruce buys 2 bars of chocolate and 1 bag of sweets for a total of \$3.60 .

Charlie buys 3 bars of chocolate and 2 bags of sweets for a total of \$6.05 .

Find the total cost of 1 bar of chocolate and 3 bags of sweets.

You must show all your working.

\$ [5]

4 Complete the table for the 5th term and the n th term of each sequence.

Sequence	1st term	2nd term	3rd term	4th term	5th term		n th term
A	3	5	7	9			
B	1	8	27	64			
C	$\frac{1}{4}$	$\frac{1}{2}$	1	2			
D	0	2	6	12			

[11]

5 (a) Kris and Laila share \$200 in the ratio 2 : 3.

(i) Show that Kris receives \$80.

[1]

(ii) Kris spends 30.8% of his \$80 on a book.

Calculate the cost of the book.

\$ [2]

(iii) Laila invests her \$120 at a rate of 1.16% per year simple interest.

Calculate the total amount Laila has at the end of 5 years.

\$ [3]

- (b) On 1 January 2020, Sangita invests an amount of money at a rate of 2% per year compound interest.

On 1 January 2023 the value of the investment is \$5306.04 .

- (i) Calculate the amount Sangita invested on 1 January 2020.

\$ [2]

- (ii) Calculate the value of the investment on 1 January 2025.

\$ [2]

- (c) Tomas invests an amount of money at a rate of 1.4% per year compound interest.

Find the number of complete years it takes for the value of his investment to increase by 50%.

..... [4]

6 (a) $\mathbf{p} = \begin{pmatrix} 2 \\ 4 \end{pmatrix}$ $\mathbf{r} = \begin{pmatrix} -1 \\ 7 \end{pmatrix}$

(i) Find $2\mathbf{p}$.

$$\begin{pmatrix} \\ \end{pmatrix} \quad [1]$$

(ii) Find $\frac{1}{4}\mathbf{p} - \mathbf{r}$.

$$\begin{pmatrix} \\ \end{pmatrix} \quad [2]$$

(iii) Find the magnitude of $\mathbf{p}$.

..... [2]

(b) K is the point $(3, 4)$.

(i) The vector from K to L is $\begin{pmatrix} -1 \\ 1 \end{pmatrix}$.

Find the coordinates of L .

(.....,) [1]

(ii) The vector from J to K is $\begin{pmatrix} 5 \\ -2 \end{pmatrix}$.

Find the coordinates of J .

(.....,) [1]

- (c) A is the point $(-1, 3)$ and B is the point $(5, 7)$.
The perpendicular bisector of the line AB meets the x -axis at C .

Find the coordinates of C .

(..... ,) [7]

- 7 (a) The time, t hours, spent watching television in one week by each of 100 students is shown in the table.

Time, t hours	$0 < t \leq 10$	$10 < t \leq 20$	$20 < t \leq 25$	$25 < t \leq 30$	$30 < t \leq 60$
Frequency	3	11	42	40	4

- (i) A pie chart is drawn to show the results.

Calculate the sector angle for the number of students who spend more than 30 hours watching television.

..... [2]

- (ii) Calculate an estimate of the mean.

..... h [2]

- (b) A shopkeeper records the midday temperature, t °C, and the number of ice creams, n , sold each day in one week.
The table shows the results.

Midday temperature, t °C	20	24	20	17	18	20	25
Number of ice creams, n	103	106	95	91	93	98	114

- (i) Write down the type of correlation shown in the table.

..... [1]

- (ii) Find the equation of the regression line, giving n in terms of t .

$n =$ [2]

- (iii) Use your answer to **part(b)(ii)** to find the number of ice creams expected to be sold when the midday temperature is 22 °C.

..... [1]

- (iv) During this week, the shopkeeper sells 700 ice creams.
She estimates that she will sell a total of 9800 ice creams during the next 14 weeks.

Give a reason why this may not be a good estimate.

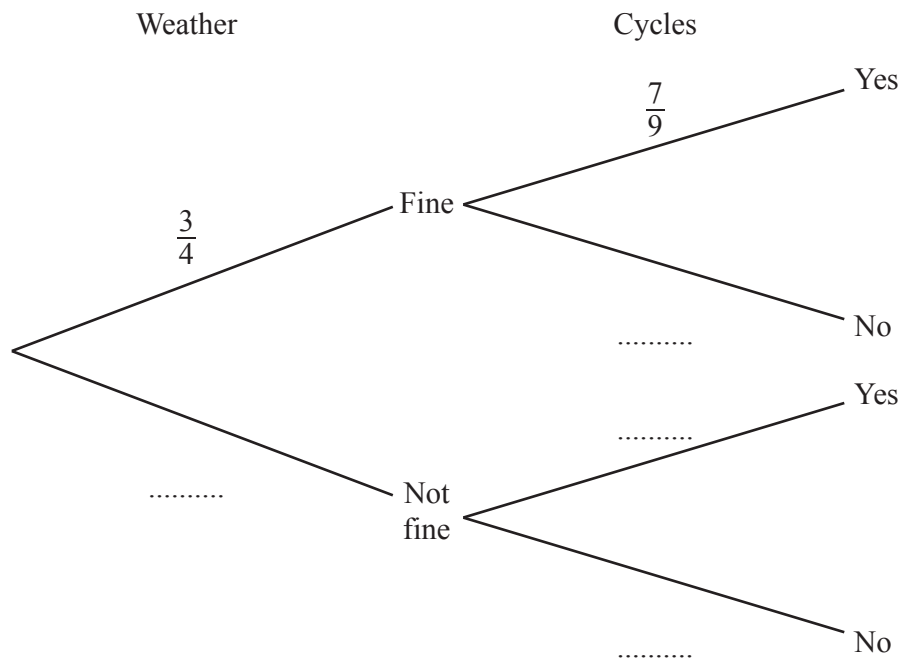
..... [1]

- (c) When the weather is fine, the probability that Lance goes cycling is $\frac{7}{9}$.

When the weather is not fine, the probability that Lance goes cycling is $\frac{1}{5}$.

The probability that the weather is fine is $\frac{3}{4}$.

- (i) Complete the tree diagram.

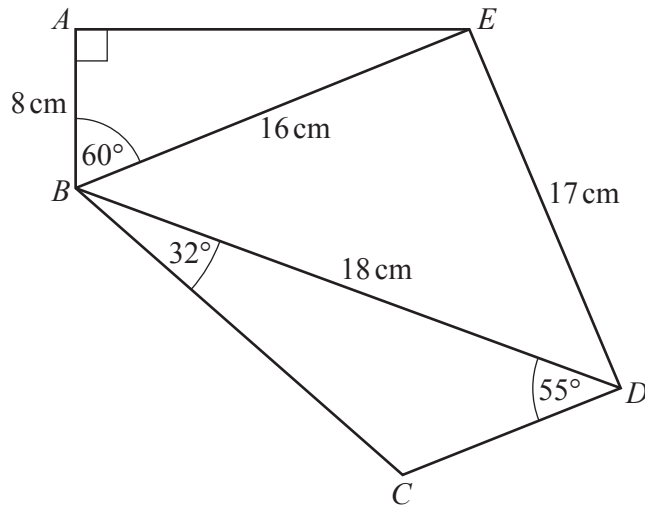


[2]

- (ii) Find the probability that Lance goes cycling.

..... [3]

8

NOT TO
SCALE

The diagram shows a pentagon $ABCDE$ and diagonals BD and BE .

(a) (i) Calculate angle BCD .

Angle $BCD = \dots\dots\dots$ [1]

(ii) Calculate BC .

$BC = \dots\dots\dots\text{ cm}$ [3]

(b) Calculate angle EBD .

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

- (c) Calculate the area of the pentagon $ABCDE$.

..... cm^2 [4]

- (d) Calculate the shortest distance from C to AE .

..... cm [4]

9 (a) $f(x) = 2x + 3$ $g(x) = x^2 + 1$ $h(x) = 2 \sin(2x)$

(i) Find $f(-2)$.

..... [1]

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

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

(iii) Find x when $g(x) = 2f(x)$.

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

(iv) Find $g(f(x))$, giving your answer in the form $ax^2 + bx + c$.

..... [3]

(v) Find the amplitude and period of $h(x)$.

Amplitude =

Period = [2]

(vi) Solve the equation $h(x) = \sqrt{3}$ for $0^\circ \leq x \leq 180^\circ$.

..... [2]

(b) $j(x) = \log_a x$, $x > 0$

(i) Find the value of $j(\sqrt[3]{a})$.

..... [1]

(ii) Find $j^{-1}(x)$.

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

- 10 (a) A machine lays a pipe of length 2.5 km in 18 hours.
The machine always works at the same rate.

Calculate the time it takes to lay a pipe of length 4 km.

..... hours [2]

- (b) t varies inversely as the square root of x .
 x varies directly as the square of y .

When $x = 4$, $t = 3$.

When $y = 4$, $x = 81$.

$$ty = h$$

Find the value of h .

$h =$ [5]

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.