



CANDIDATE
NAME

--

CENTRE
NUMBER

--	--	--	--	--

CANDIDATE
NUMBER

--	--	--	--

4024/22

May/June 2024

2 hours 30 minutes

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 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 π , use either your calculator value or 3.142.

- The total mark for this paper is 100.
- The number of marks for each question or part question is shown in brackets [].

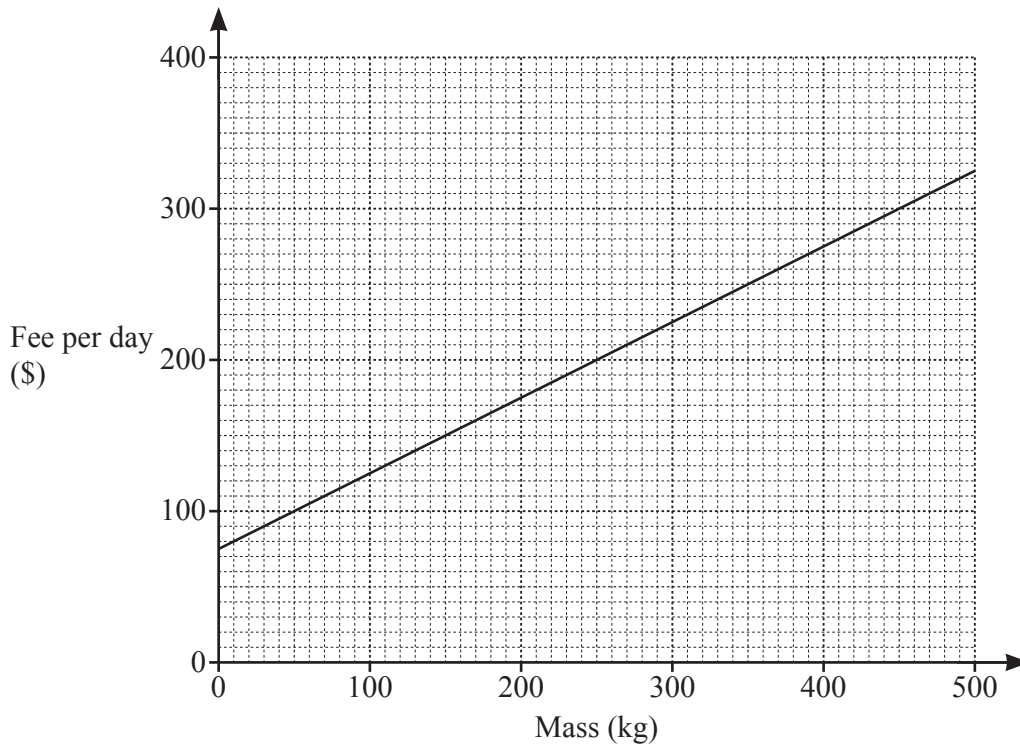
This document has **20** pages. Any blank pages are indicated.

- 1 (a) Oranges cost \$1.45 per kilogram.
Asher buys 1.2 kg of oranges.

Find the change he receives from \$10.

\$ [1]

- (b) Maria pays a fee to sell strawberries at a market.
Each day she pays \$75 plus a payment for the mass of strawberries she sells.
The fee Maria pays per day is shown on the graph.



- (i) One day Maria's fee is \$240.

Use the graph to find the mass of strawberries she sells that day.

..... kg [1]

- (ii) On Saturday Maria sells 270 kg of strawberries.
On Sunday she sells 220 kg of strawberries.

Find the **total** fee she pays for these two days.

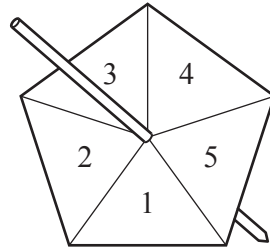
\$ [2]

- (iii) The fee per day for Maria now increases.
Each day she now pays \$90 plus a payment of \$60 for every 100 kg of strawberries she sells.
- On the grid, draw a line to represent this new fee when she sells 0 kg to 500 kg of strawberries in a day.

[2]

- (c) Write the ratio $1.6 \text{ kg} : 600 \text{ g} : 2.4 \text{ kg}$ in its simplest form.

..... : : [2]



The diagram shows a fair spinner numbered from 1 to 5.
The score is the number the spinner lands on.

- (a) The spinner is spun once.

Find the probability that the score is

- (i) 3

..... [1]

- (ii) even.

..... [1]

- (b) The spinner is spun twice.
The two scores are added together.

- (i) Complete the possibility diagram to show all the outcomes.

		First spin				
Second spin	+	1	2	3	4	5
	1	2	3	4	5	6
	2	3	4	5	6	7
	3	4	5	6		
	4					
	5					

[2]

- (ii) Find the probability that the outcome is 4.

..... [1]

- (iii) Find the probability that the outcome is greater than 6.

..... [2]

- 3 (a) The exchange rate between dollars (\$) and Malaysian Ringgits (MYR) is $\$1 = 4.19 \text{ MYR}$.
The exchange rate between dollars (\$) and Pakistani Rupees (PKR) is $\$1 = 179.12 \text{ PKR}$.

Find the exchange rate between Malaysian Ringgits and Pakistani Rupees.

$$1 \text{ MYR} = \dots\dots\dots \text{PKR} \quad [2]$$

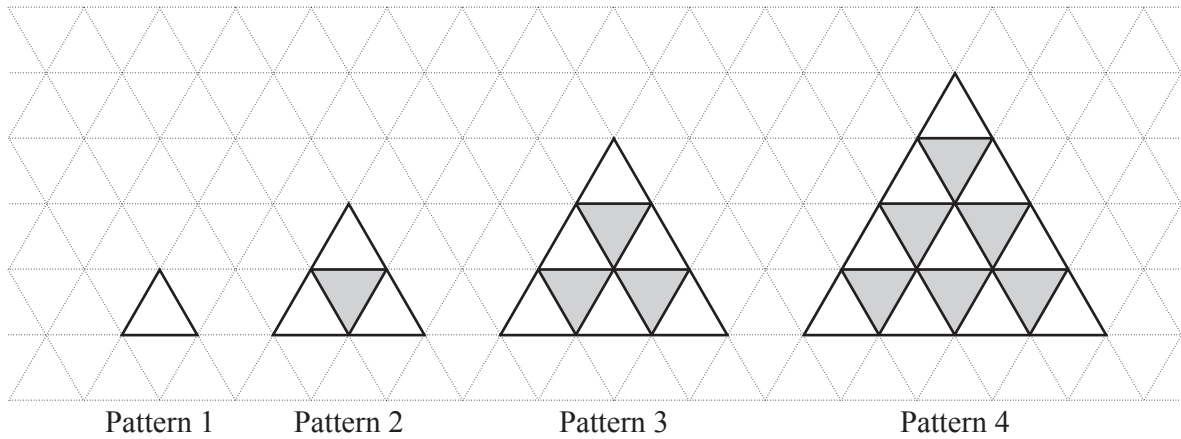
- (b) Farhad invests \$1500 in an account paying compound interest at a rate of 4% per year.
Gulsan invests \$1500 in an account paying simple interest at a rate of $x\%$ per year.

Farhad and Gulsan have the same amount of money in their accounts at the end of 2 years.

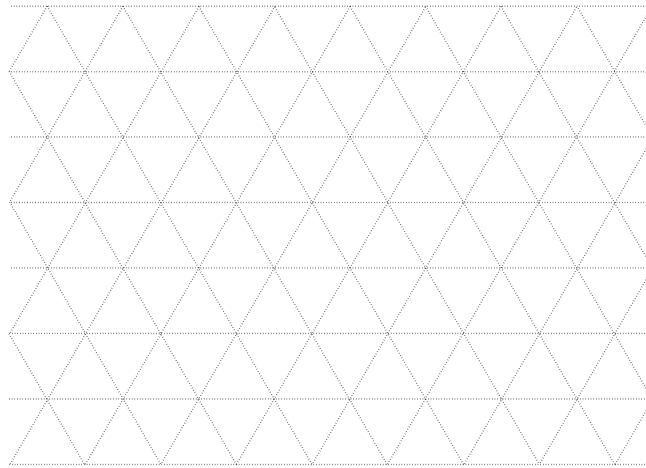
Calculate the value of x .

$$x = \dots\dots\dots [4]$$

- 4 (a) The diagrams show the first four patterns in a sequence.



- (i) Draw Pattern 5 on the grid below.



[1]

- (ii) Complete the table.

Pattern (n)	1	2	3	4	5	6
Total number of triangles	1	4	9	16		
Number of grey triangles	0	1	3			
Number of white triangles	1	3	6			

[2]

- (iii) Write an expression, in terms of n , for the total number of triangles in Pattern n .

..... [1]

- (iv) Write an expression, in terms of n , for the number of white triangles in Pattern n .

..... [2]

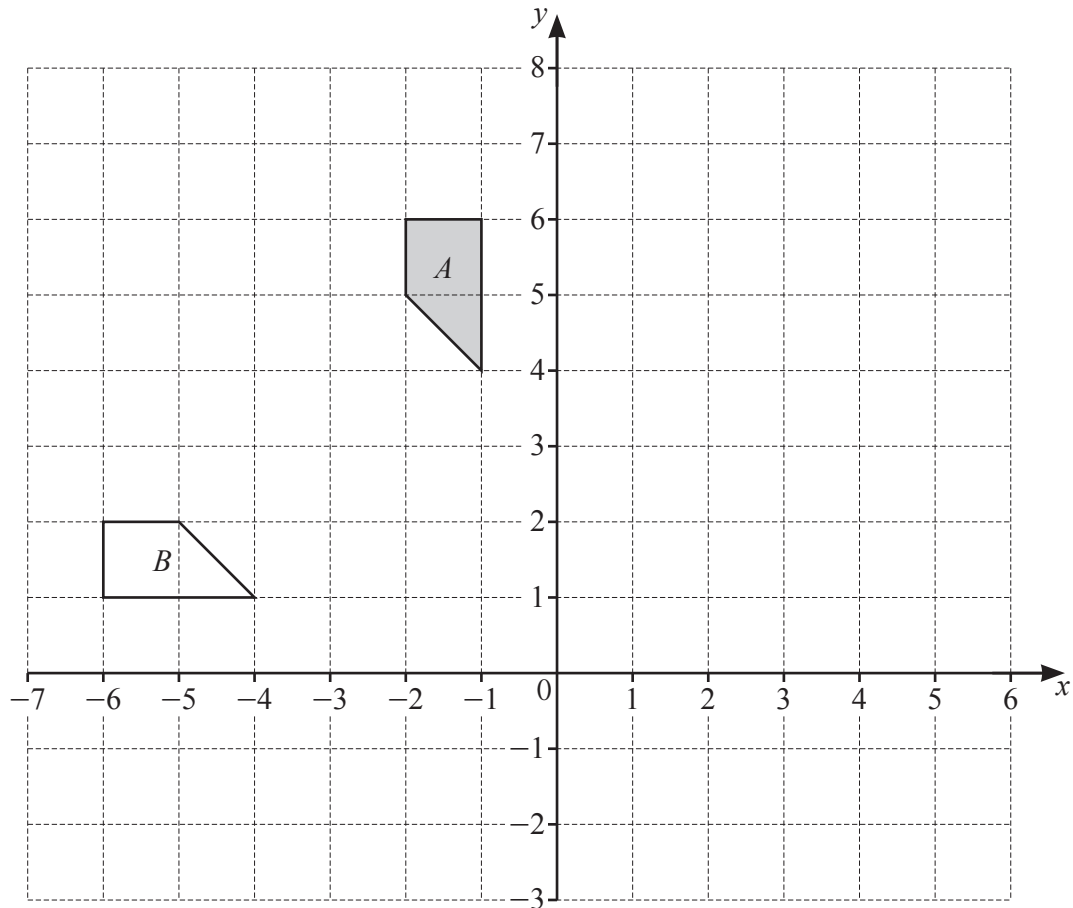
- (b) The 3rd term of a linear sequence is 34.
The 8th term of the same linear sequence is 14.

- (i) Find the value of the first term of this sequence.

..... [2]

- (ii) Find the value of the first negative term of this sequence.

..... [1]
[Turn over]



- (a) Describe fully the **single** transformation that maps shape *A* onto shape *B*.

.....

..... [2]

- (b) Shape *A* is mapped onto shape *C* by an enlargement of scale factor 3.
Two of the vertices of shape *C* are (2, 5) and (5, 2).

- (i) Find the coordinates of the centre of the enlargement.

(..... ,) [2]

- (ii) Find the area of shape *C*.

..... units² [2]

- (c) Transformation T is represented by the matrix $\begin{pmatrix} 0 & -1 \\ 1 & 0 \end{pmatrix}$.

Transformation T maps shape *A* onto shape *D*.

- (i) On the grid, draw shape *D*.

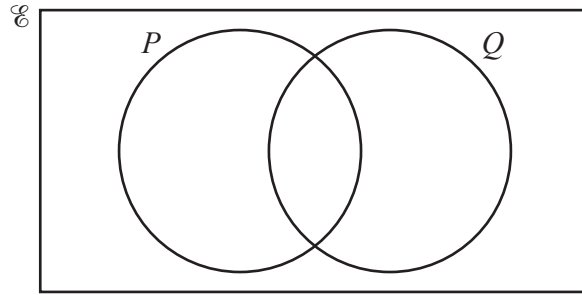
[2]

- (ii) Describe fully the **single** transformation represented by the matrix $\begin{pmatrix} 0 & -1 \\ 1 & 0 \end{pmatrix}$.

.....

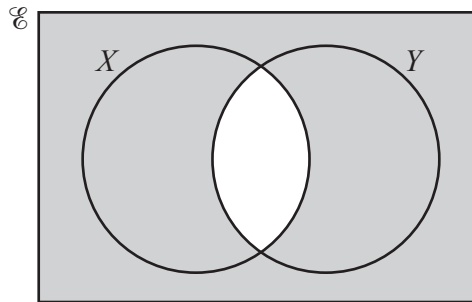
..... [3]

- 6 (a) In the Venn diagram, shade the region represented by $P \cup Q$.



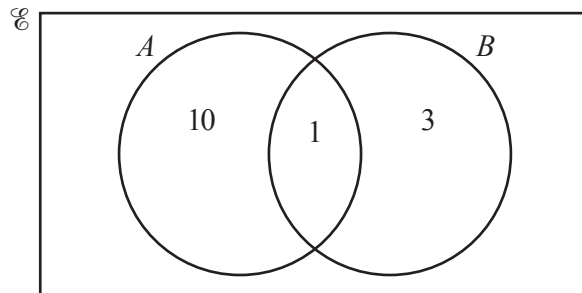
[1]

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



..... [1]

- (c) $E = \{1, 2, 3, 4, 5, 6, 7, 8, 9, 10\}$
 $A = \{x : x \text{ is a factor of } 40\}$
 $B = \{x : x \text{ is an odd number}\}$



- (i) Complete the Venn diagram. [2]

- (ii) List the elements of $A' \cap B$.

..... [1]

- (iii) One element of E is chosen at random.

Find the probability that this element is in $A \cap B$.

..... [1]

7 (a) Solve $\frac{x}{3} = 7$.

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

(b) Solve $6x - 5 = 2(x + 3)$.

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

(c) Factorise $3x^2 - 2x - 8$.

$\dots\dots\dots$ [2]

(d) $(ax + b)^2 = 4x^2 - 12x + c$

Given that $a > 0$, find the value of each of a , b and c .

$a = \dots\dots\dots$

$b = \dots\dots\dots$

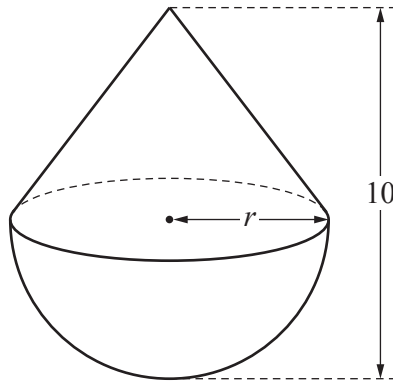
$c = \dots\dots\dots$ [3]

8 (a) [Volume of a cone = $\frac{1}{3}\pi r^2 h$]

[Volume of a sphere = $\frac{4}{3}\pi r^3$]

[Curved surface area of cone = $\pi r l$]

[Surface area of a sphere = $4\pi r^2$]



A solid is formed by placing a cone on top of a hemisphere.

The cone and the hemisphere each have radius r cm.

The height of the solid is 10 cm.

The curved surface area of the hemisphere is 145 cm^2 .

(i) Show that $r = 4.80$, correct to 2 decimal places.

[3]

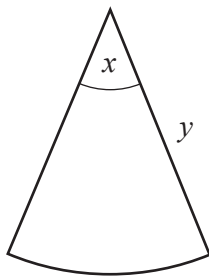
(ii) Calculate the volume of the solid.

..... cm^3 [4]

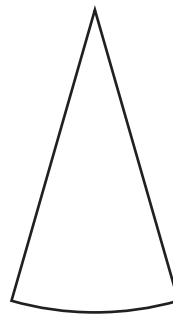
- (iii) Calculate the curved surface area of the cone.

..... cm^2 [4]

(b)



Sector A



Sector B

NOT TO
SCALE

The diagram shows two sectors of circles.
Sector A has angle x and radius y .

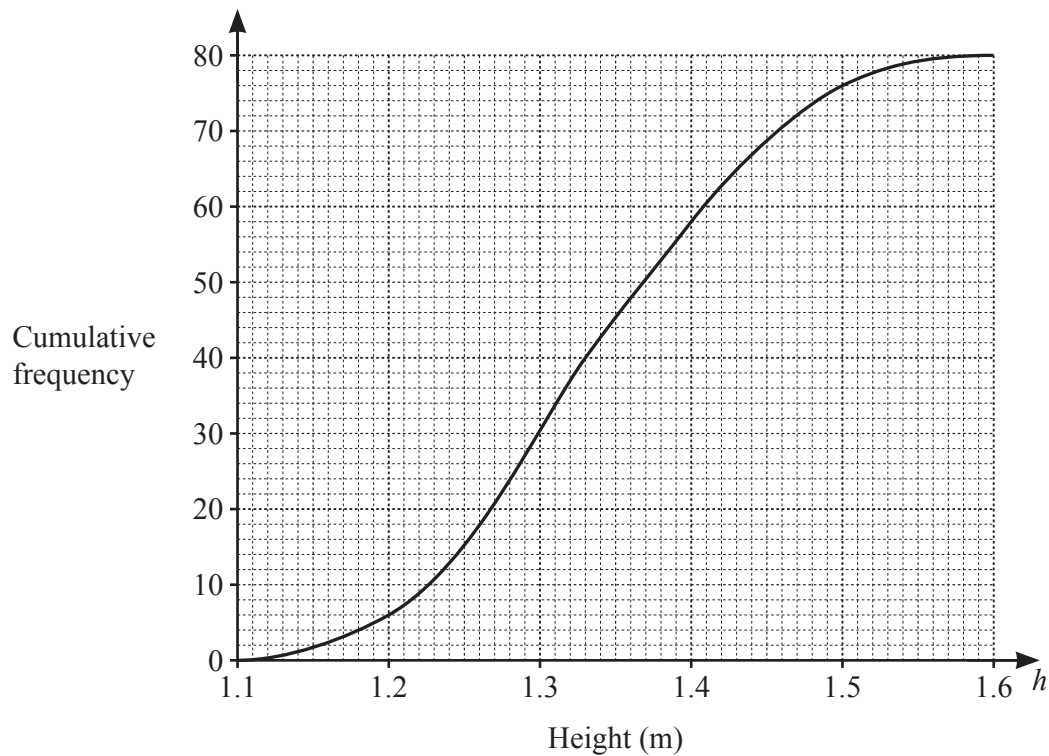
The angle of sector B is 20% smaller than the angle of sector A .
The radius of sector B is 20% longer than the radius of sector A .

Calculate the area of sector B as a percentage of the area of sector A .

..... % [4]

9 A shop sells two varieties of apple tree.

(a) The cumulative frequency diagram shows the heights, in metres, of 80 Variety *A* trees.



(i) Use the diagram to estimate

(a) the median

..... m [1]

(b) the 30th percentile.

..... m [2]

(ii) Trees with a height greater than y m are graded Class I.
 $\frac{2}{5}$ of the 80 trees are graded Class I.

Find the value of y .

$y =$ [2]

(iii) Complete the frequency table for the heights of the Variety *A* trees.

Height (h m)	$1.1 < h \leq 1.2$	$1.2 < h \leq 1.3$	$1.3 < h \leq 1.4$	$1.4 < h \leq 1.5$	$1.5 < h \leq 1.6$
Frequency	6	24			

[2]

(b) The frequency table shows the heights of 50 Variety *B* trees.

Height (<i>h</i> m)	$1.5 < h \leq 1.7$	$1.7 < h \leq 1.8$	$1.8 < h \leq 1.9$	$1.9 < h \leq 2.3$
Frequency	p	15	17	q

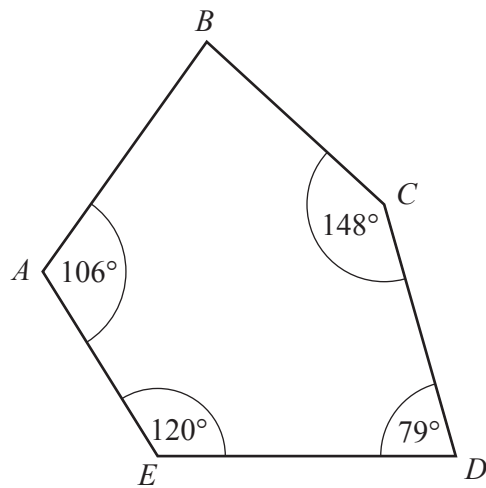
Using the midpoints of the intervals, the estimated mean height of these Variety *B* trees is 1.81 m.

Calculate the value of p and the value of q .

$$p = \dots\dots\dots$$

$$q = \dots\dots\dots [6]$$

10



NOT TO
SCALE

The diagram shows a pentagon.

(a) Calculate the interior angle B .

..... [2]

- (b) In the pentagon, $AE = 8$ cm and $AD = 15$ cm.

Calculate the length ED .

Show your working and give your answer correct to 1 decimal place.

$ED = \dots\dots\dots$ cm [5]

11 Q is the point $(n, -4)$, R is the point $(-1, 8)$ and S is the point $(3, 2)$.

(a) The length QR is 13 units.

Find the two possible values of n .

$n = \dots\dots\dots$ or $n = \dots\dots\dots$ [3]

(b) RST is a straight line and $RS : RT = 2 : 5$.

Find the coordinates of T .

$(\dots\dots\dots, \dots\dots\dots)$ [2]

- (c) Find the equation of the perpendicular bisector of RS .

..... [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.