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MATHEMATICS**0580/32**

Paper 3 (Core)

February/March 2020**2 hours**

You must answer on the question paper.

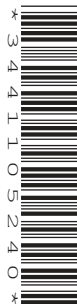
You will need: Geometrical instruments

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 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.

INFORMATION

- The total mark for this paper is 104.
- The number of marks for each question or part question is shown in brackets [].

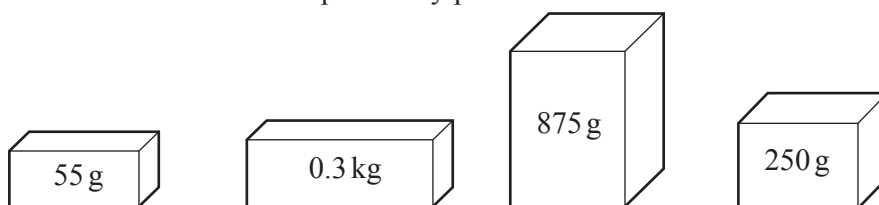
This document has **20** pages. Blank pages are indicated.

1 Navja works in a post office.

- (a) The table shows the costs of sending parcels by post.
The cost depends on the mass, m grams, of the parcel.

Type of parcel	Mass (g)	Cost (\$)
Small	$0 < m \leq 60$	0.76
Medium	$60 < m \leq 100$	0.95
Large	$100 < m \leq 250$	2.20
Extra large	$250 < m \leq 1000$	5.60

- (i) Sai sends each of these four parcels by post.



He pays with a \$20 note.

Work out how much change he receives.

\$ [4]

- (ii) On 1 April, the cost of sending any parcel increases by 5%.

- (a) Show that the increase in the cost of sending an **Extra large** parcel is \$0.28 .

[1]

- (b) Avani says

“As the cost of an **Extra large** parcel increases by \$0.28 then the cost of a **Large** parcel will also increase by \$0.28 to \$2.48.”

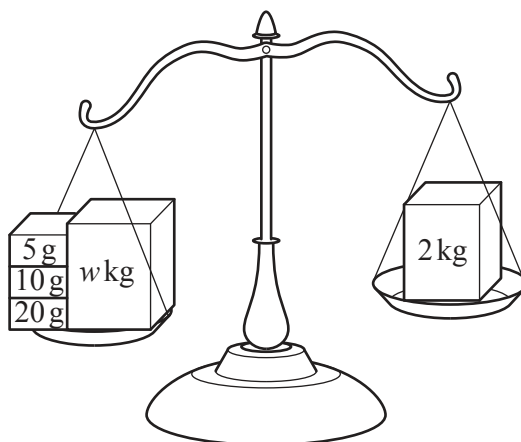
Explain why Avani is incorrect.

.....

..... [1]

3

- (b) (i) Navja weighs a parcel with mass w kg on her scales. She uses the masses shown to balance the scales.



Work out the value of w .

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

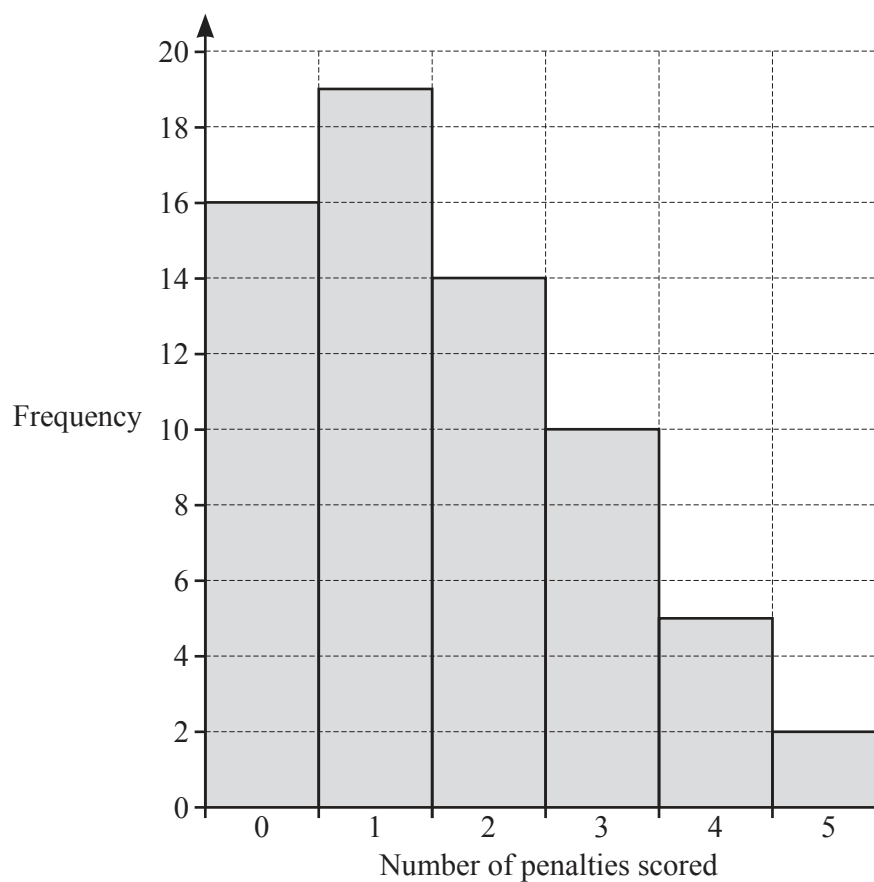
- (ii) Sometimes Navja uses an electronic weighing machine. The machine gives the mass, p kg, of a parcel as 12.4 kg, correct to the nearest 100 g.

Complete this statement about the value of p .

$$\dots\dots\dots \leq p < \dots\dots\dots [2]$$

4

- 2 (a) 66 football players each take five penalties.
The number of penalties that each player scores is recorded.
The results are shown in the bar chart.



- (i) Write down the mode.

..... [1]

- (ii) Write down the range.

..... [1]

- (iii) Calculate the mean.

..... [3]

5

(b) The attendance at a football match is 11 678.

(i) Write 11 678 in words.

..... [1]

(ii) Write 11 678 correct to the nearest 100.

..... [1]

(c) In a football stadium there are 15 000 seats.
10 650 of these seats are occupied.

Find the percentage of the 15 000 seats that are occupied.

..... % [1]

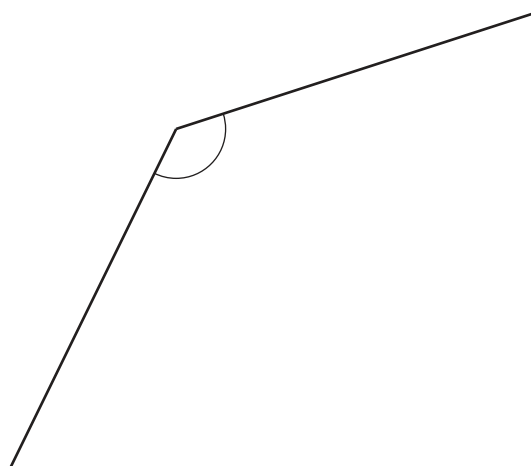
(d) A ticket to a football match costs \$20.

Calculate the cost of the ticket in rupees when the exchange rate is 1 rupee = \$0.016 .

..... rupees [2]

6

3 (a)



(i) Write down the mathematical name for this type of angle.

..... [1]

(ii) Measure this angle.

..... [1]

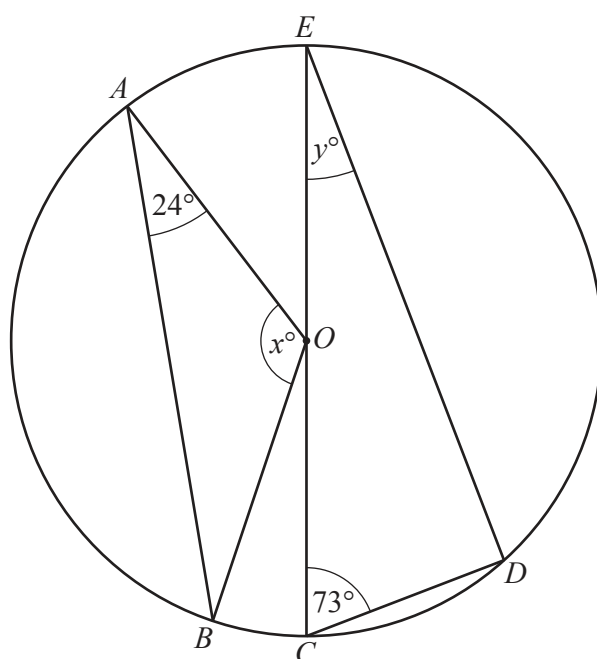
(b) (i) Write down the mathematical name for an 8-sided polygon.

..... [1]

(ii) Work out the size of an interior angle of a regular 24-sided polygon.

..... [2]

(c)

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The diagram shows a circle, centre O , with diameter CE .
 A, B, C, D and E lie on the circumference of the circle.

- (i) Find the value of x .
 Give a reason for your answer.

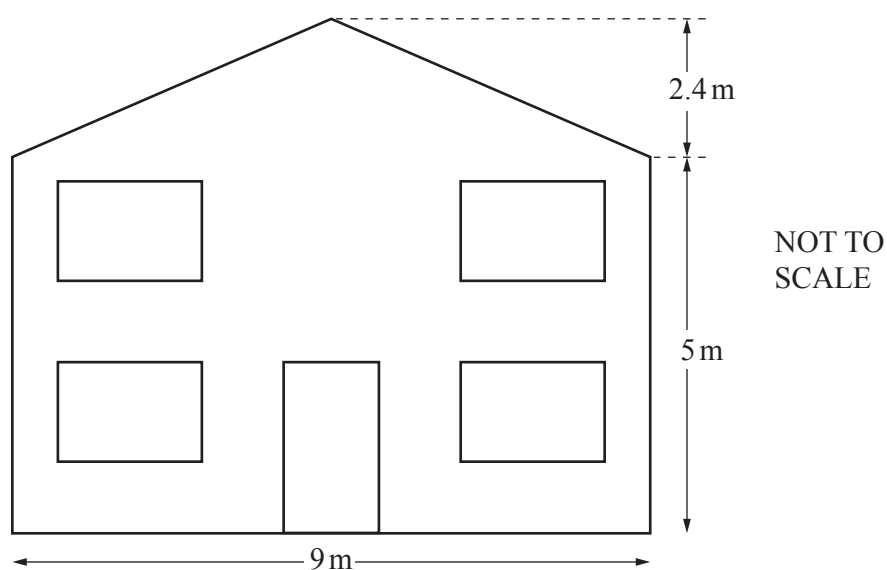
$x = \dots\dots\dots$ because $\dots\dots\dots$ [3]

- (ii) Find the value of y .
 Give a reason for your answer.

$y = \dots\dots\dots$ because $\dots\dots\dots$ [2]

- (iii) Draw a tangent to the circle at A . [1]

4 (a)



The diagram shows the front of Pranav's house.

(i) Work out the total area of the front of his house.

..... m^2 [3]

(ii) The door is 0.9 m wide and 2.1 m high.
Each of the four windows are 1.5 m wide and 1.2 m high.

Work out the total area of the door and the four windows.

..... m^2 [3]

(iii) Pranav paints the front of his house but not the door and not the four windows.

Work out the area he paints.

..... m^2 [1]

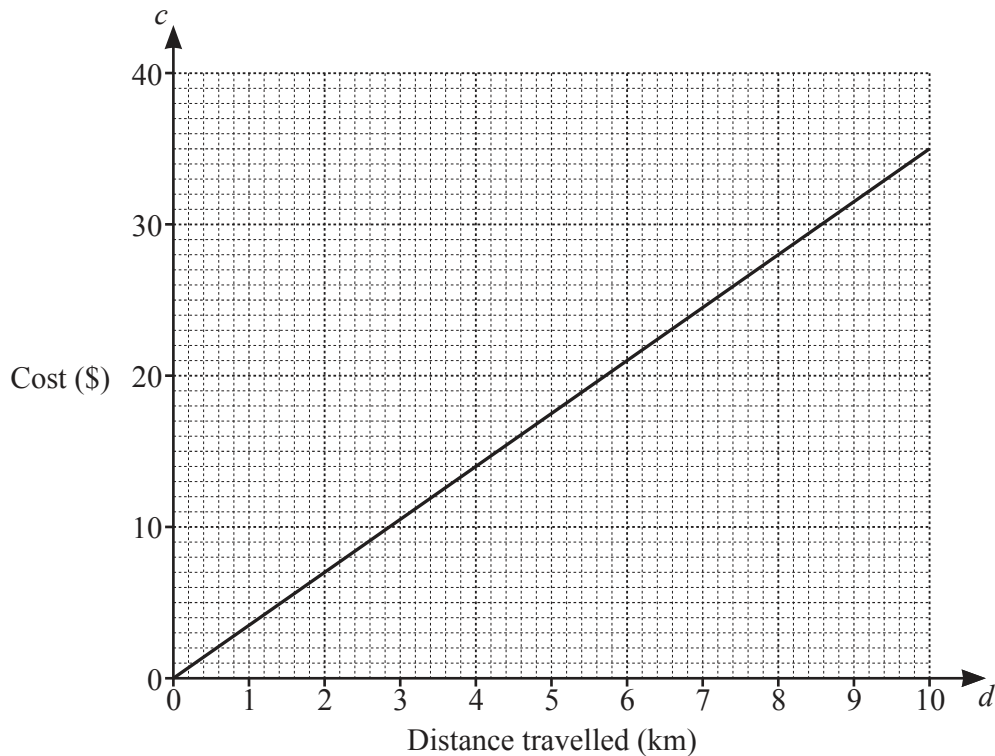
9

- (b)** Pranav paints a wall of area 53 m^2 .
One litre of paint covers an area of 4.5 m^2 .
Paint is sold in 2.5 litre tins, each costing \$24.75 .
Pranav buys the least number of tins to paint this wall.

Work out the cost of the paint.

\$ [4]

5 (a)



(i) The graph shows the cost, \$ c , of travelling a distance, d km, with *Saanvi's Taxis*.

(a) Write down the cost of a 4 km journey.

\$ [1]

(b) Complete this statement.

Saanvi's Taxis cost \$ for each kilometre travelled. [1]

(c) Find the equation of the line.

$c =$ [1]

(ii) *Krishna's Taxis* cost \$5 to hire plus \$2 for each kilometre travelled.

(a) Show that the cost of a 4 km journey with *Krishna's Taxis* is \$13.

[1]

(b) Find an equation for the cost, \$ c , of travelling d kilometres with *Krishna's Taxis*.

$c =$ [2]

(c) On the grid, draw a line to show the cost of travelling with *Krishna's Taxis*.

[2]

- (d) Mrs Singh wants to hire a taxi.
She says that *Saanvi's Taxis* are always cheaper than *Krishna's Taxis*.

Is Mrs Singh correct?

Give a reason for your answer. Use your graph to help you.

..... because

..... [1]

- (b) A minibus can be hired from *Dhruv's Minibuses*.
The cost is \$ h per hour plus \$ p per passenger.

- (i) When the minibus is hired for 3 hours with 10 passengers the cost is \$61.

Complete the equation.

$$3h + 10p = \dots\dots\dots$$

[1]

- (ii) When the minibus is hired for 5 hours with 8 passengers the cost is \$80.

Write this information as an equation.

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

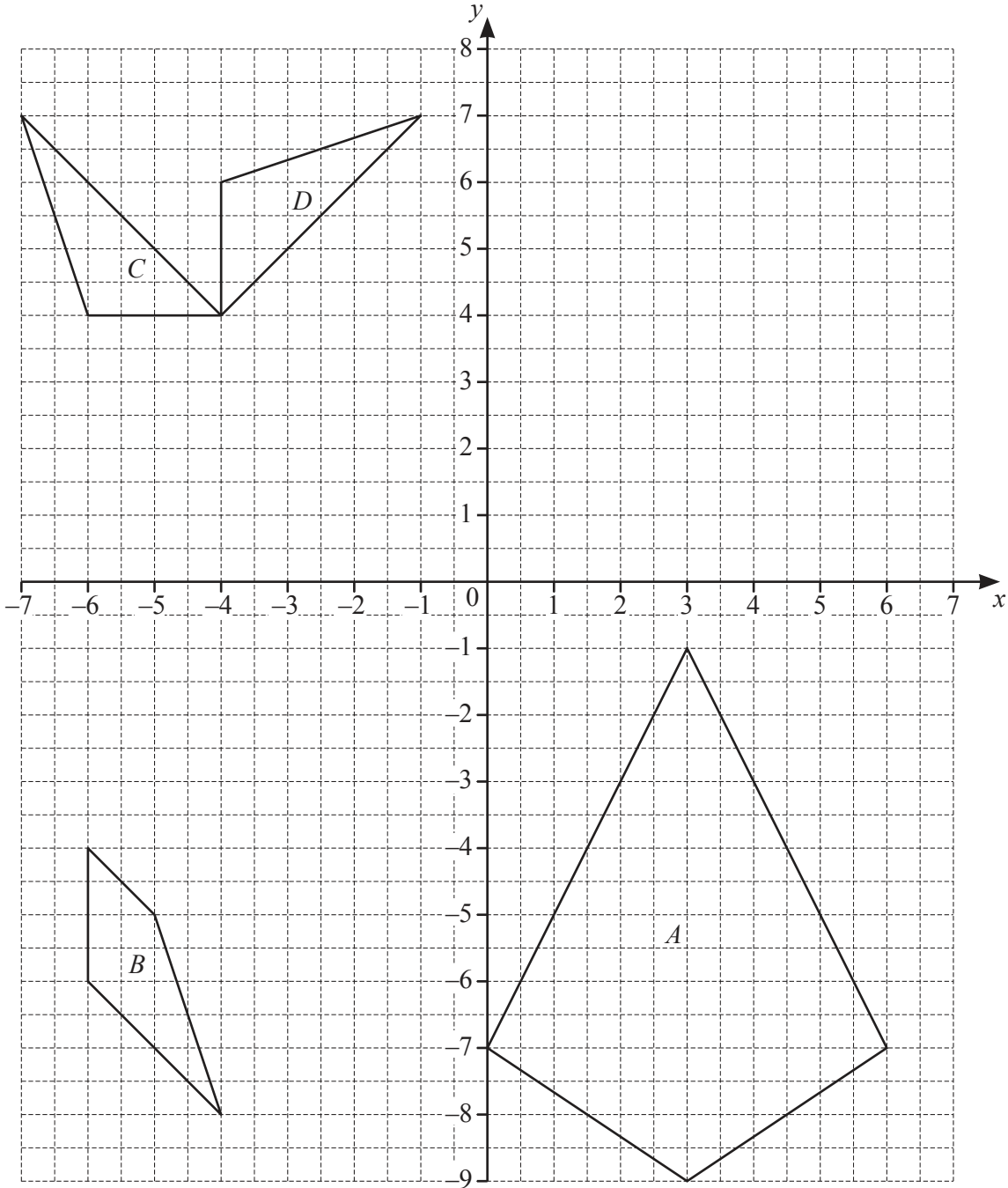
[2]

- (iii) Solve your two simultaneous equations to find h and p .
You must show all your working.

$$h = \dots\dots\dots$$

$$p = \dots\dots\dots [4]$$

6 (a)



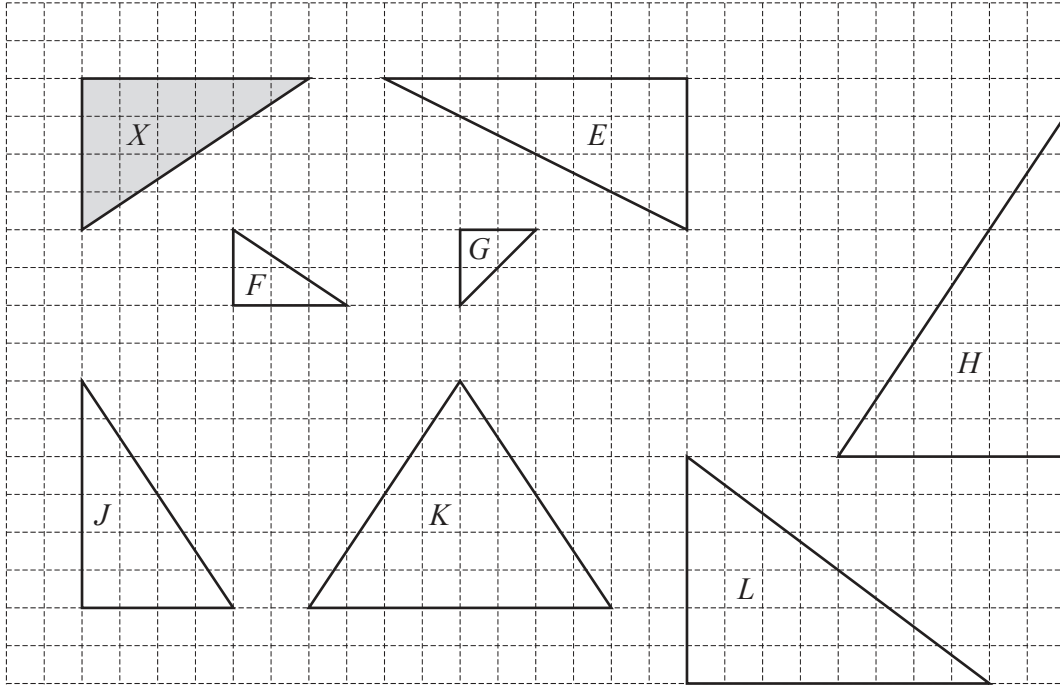
- (i) On the grid, draw the image of
- (a) shape *A* after an enlargement with scale factor $\frac{1}{2}$, centre $(3, -5)$, [2]
 - (b) shape *B* after a reflection in the line $y = -3$. [2]

- (ii) Describe fully the **single** transformation that maps triangle *C* onto triangle *D*.

.....

..... [3]

(b)



For the triangles shown on the grid, write down the letter of each triangle that is

- (i) congruent to triangle *X*,

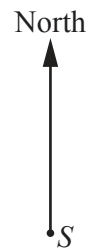
..... [1]

- (ii) similar to triangle *X*.

..... [2]

14

- 7 (a) The scale drawing shows the positions of a rock, R , and a statue, S , on a map.
The scale is 1 centimetre represents 6 metres.



Scale: 1 cm to 6 m

- (i) Work out the actual distance between R and S .

..... m [2]

- (ii) A flagpole, F , is on a bearing of 164° from S .

Work out the bearing of S from F .

..... [2]

- (iii) Ishaan uses the map to find some treasure, T .
 T is on a bearing of 076° from R and on a bearing of 337° from S .

Mark the position of T on the map.

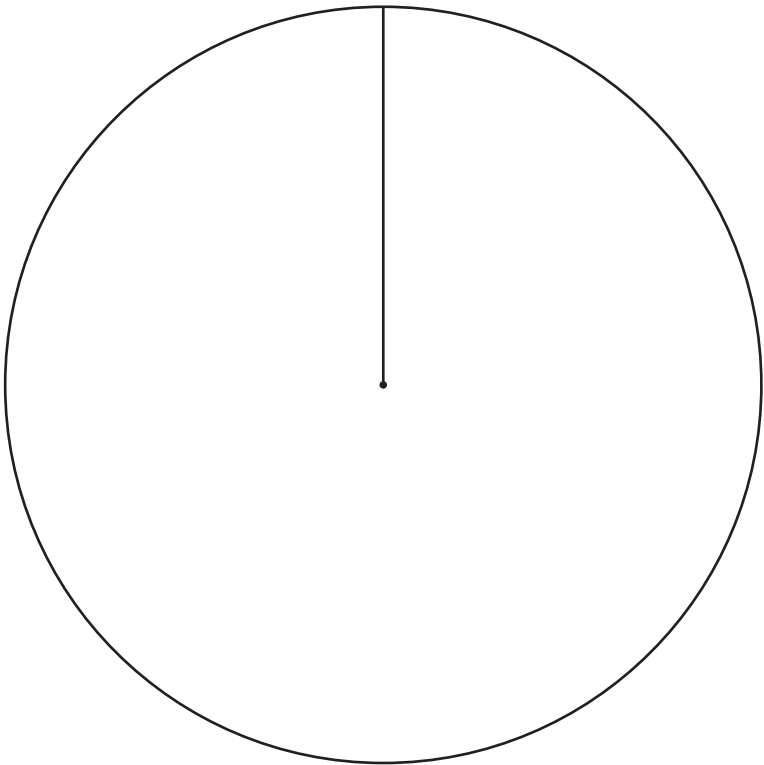
[2]

- (b) The treasure is a bag of coins.
The coins are made from three different metals.

Metal	Percentage	Pie chart sector angle
Copper	70%	
Zinc	20%	
Tin	10%	

(i) Complete the table. [2]

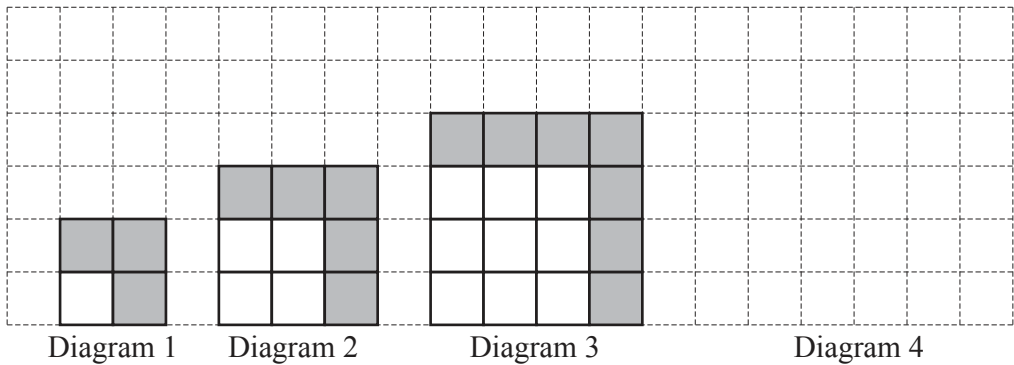
(ii) Complete the pie chart.



[2]

8 The grid shows the first three diagrams in a sequence.

Each diagram is made using small squares that are white or grey.



(a) On the grid, draw Diagram 4. [1]

(b) Write down the term to term rule for the number of grey squares. [1]

(c)

Diagram number	1	2	3	4		n
Number of small white squares	1	4	9			
Number of small grey squares	3	5	7			
Total number of small squares	4	9	16			

Complete the table. [6]

17

- (d) Work out the number of small white squares in Diagram 18.

..... [1]

- (e) One of the diagrams has a total of 900 small squares.

Work out its Diagram number.

Diagram [2]

- (f) Another diagram has 43 small grey squares.

Work out the total number of small squares in this diagram.

..... [3]

18

- 9 (a) $\mathcal{C} = \{1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14\}$
 $F = \{x: x \text{ is a factor of } 14\}$
 $P = \{x: x \text{ is a prime number less than } 14\}$

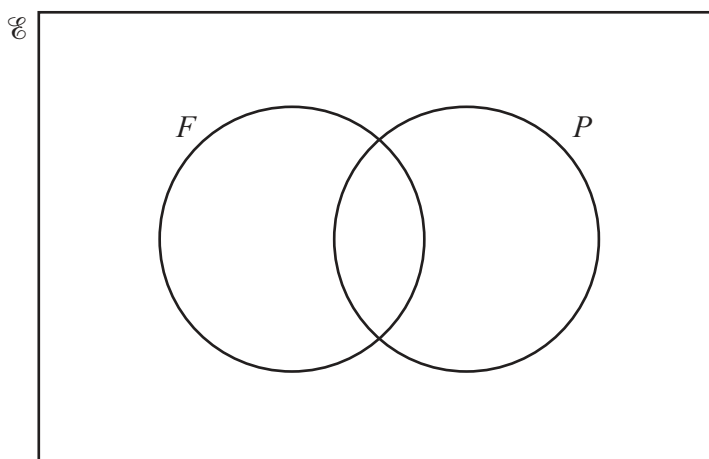
(i) Write down the elements in set F .

$F = \{ \dots \}$ [2]

(ii) Write down the elements in set P .

$P = \{ \dots \}$ [2]

(iii)



(a) Complete the Venn diagram.

[2]

19

(b) Write down $n(F \cap P)$.

..... [1]

(c) A number is chosen at random from the universal set $\mathcal{E}$.

Write down the probability that the number is in the set $F \cup P$.

..... [2]

(b) Write 195 as a product of its prime factors.

..... [2]

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