Cambridge Assessment International Education

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3441105240

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.

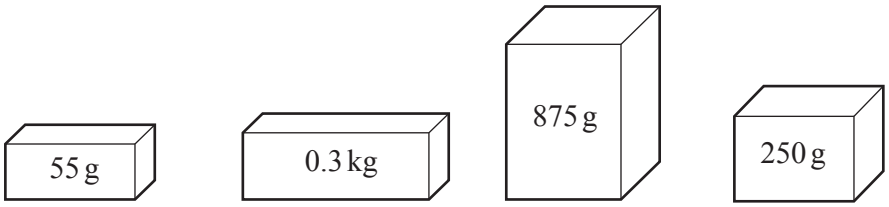
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1 Navja works in a post office.

(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	$0 < m \leqslant 60$	0.76
Medium	$60 < m \leqslant 100$	0.95
Large	$100 < m \leqslant 250$	2.20
Extra large	$250 < m \leqslant 1000$	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."

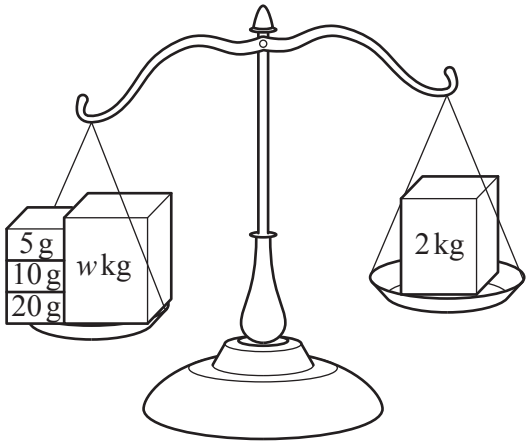
Explain why Avani is incorrect.

.....

..... [1]

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(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.

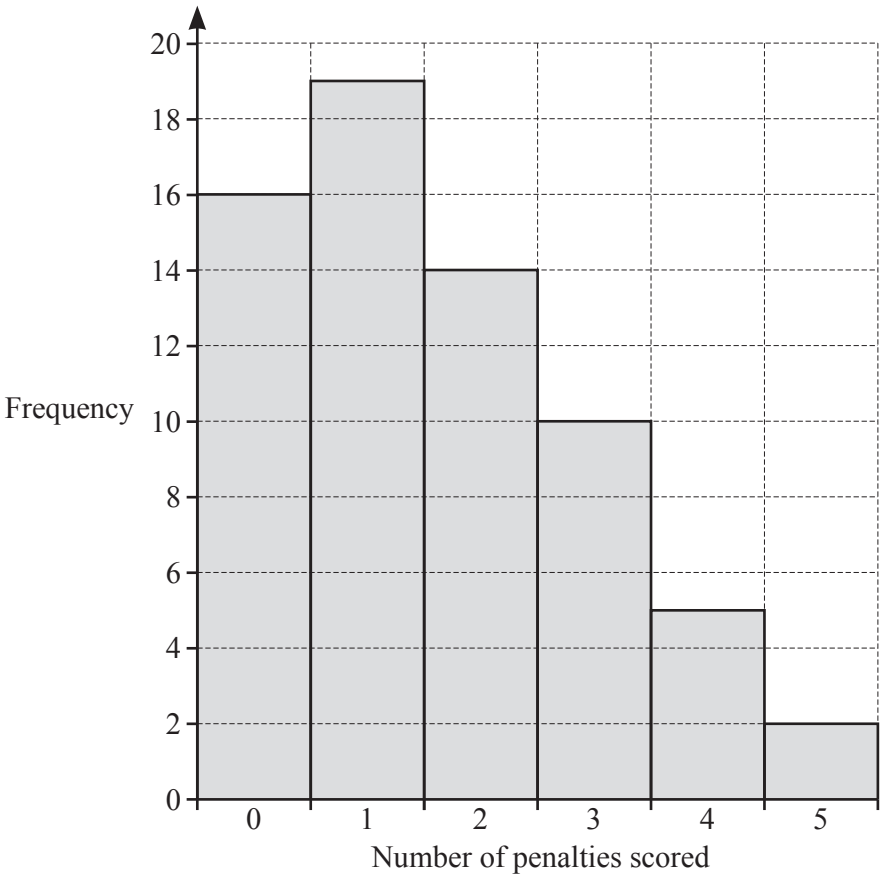
$w =$ ..... [3]

(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.

..... $\leqslant p <$ ..... [2]

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]

(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]

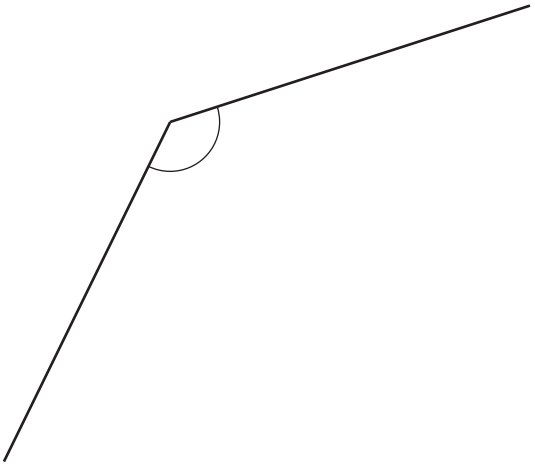
(d) A ticket to a football match costs $20.

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

..... rupees [2]

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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.

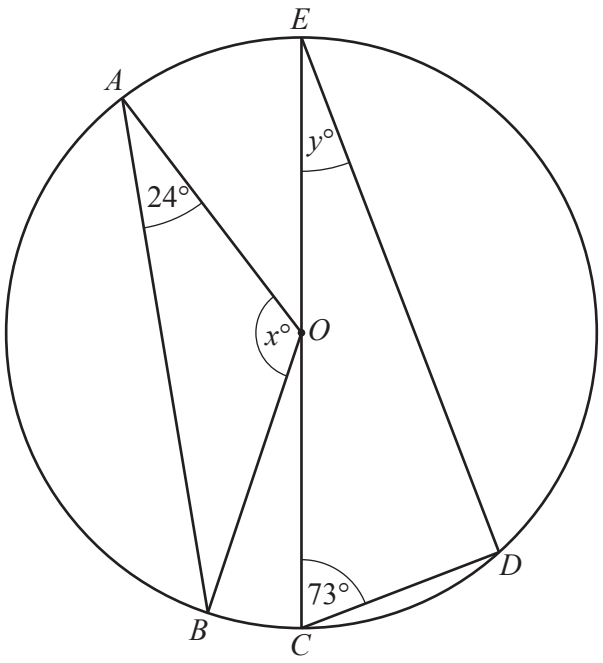
..... [1]

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

..... [2]

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(c)



NOT TO SCALE

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.

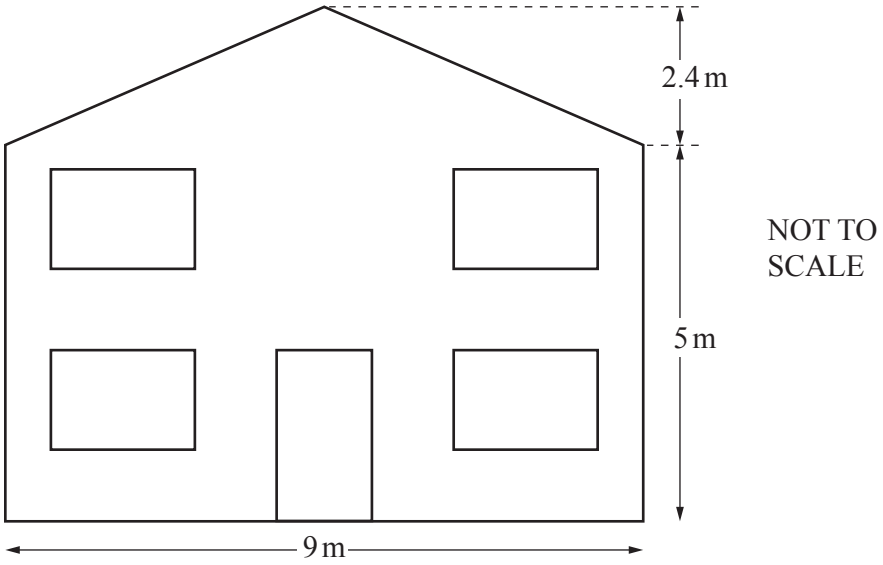
$x =$ ..... because ..... [3]

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

$y =$ ..... because ..... [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]

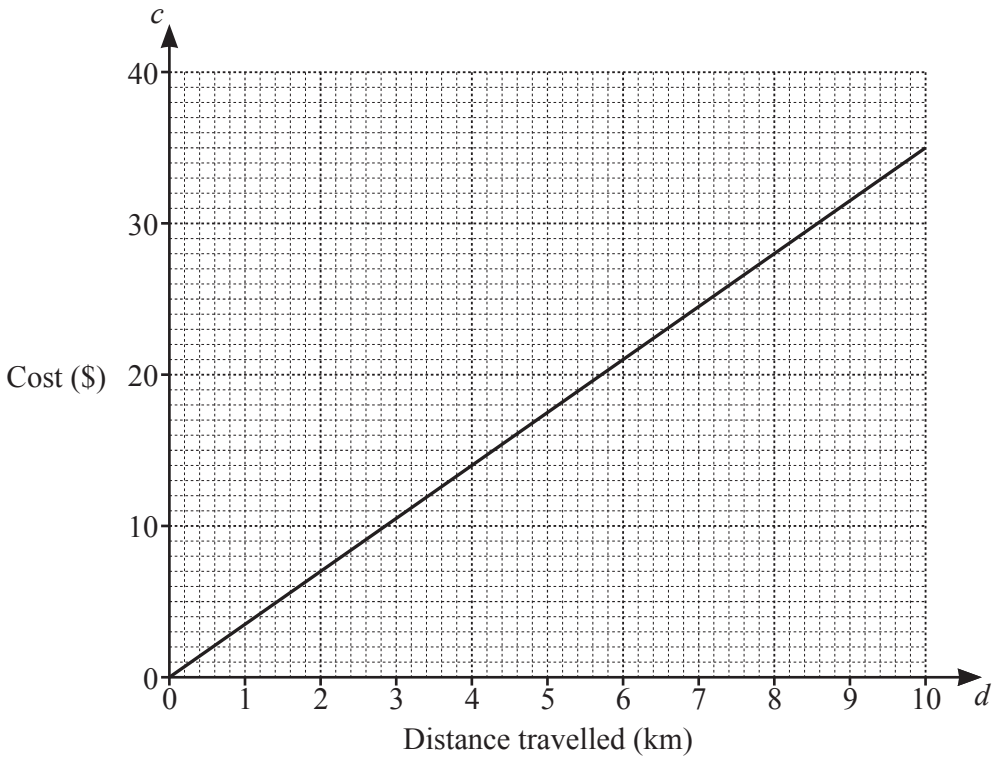
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(b) Pranav paints a wall of area 53 m^2.
One litre of paint covers an area of 4.5 m^2.
Paint is sold in 2.5 litre tins, each costing $24.75 .
Pranav buys the least number of tins to paint this wall.

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]

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(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.

$$3h + 10p = ...$$

[1]

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

Write this information as an equation.

..... = ...

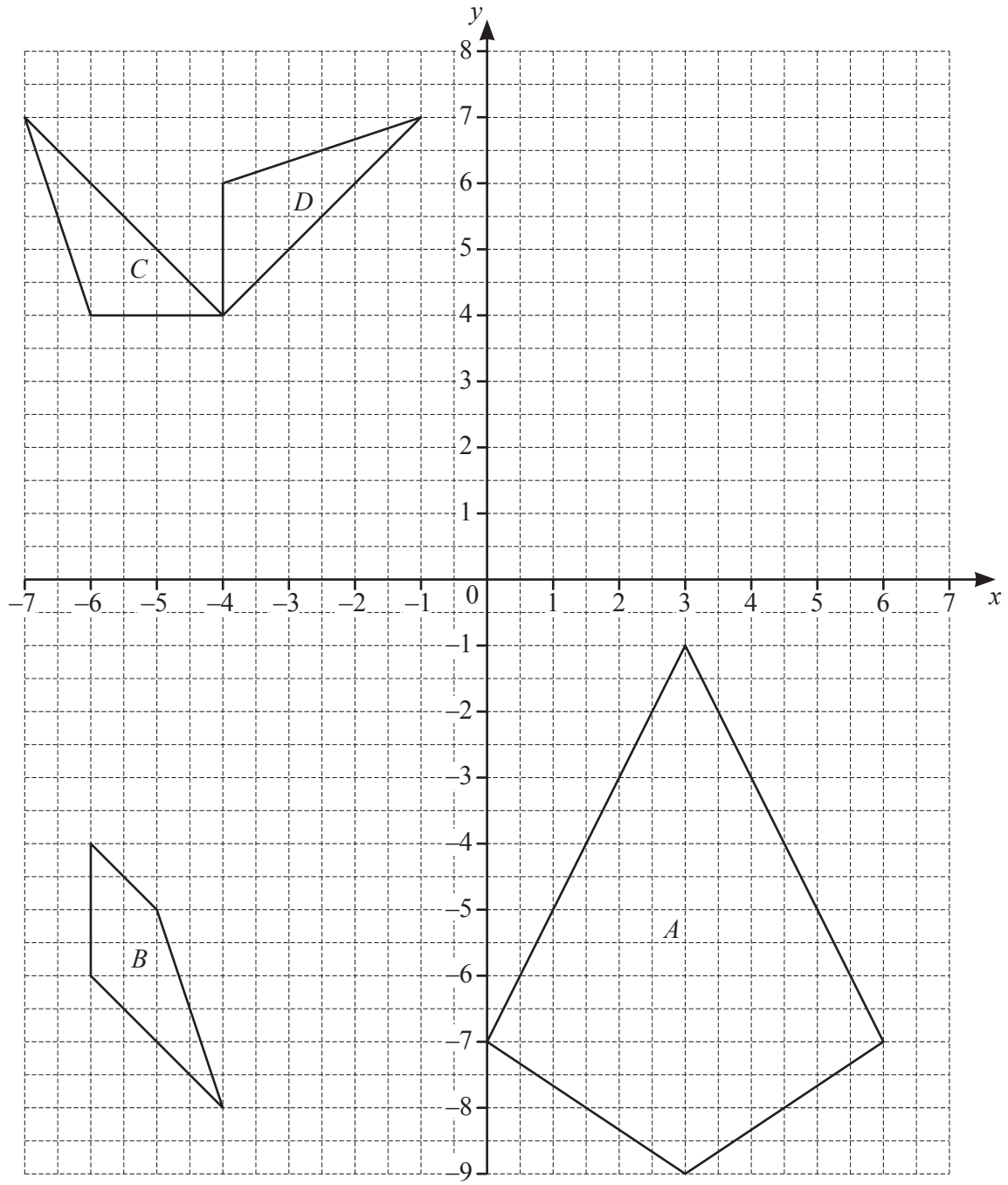
[2]

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

$h =$ .....

$p =$ ..... [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]

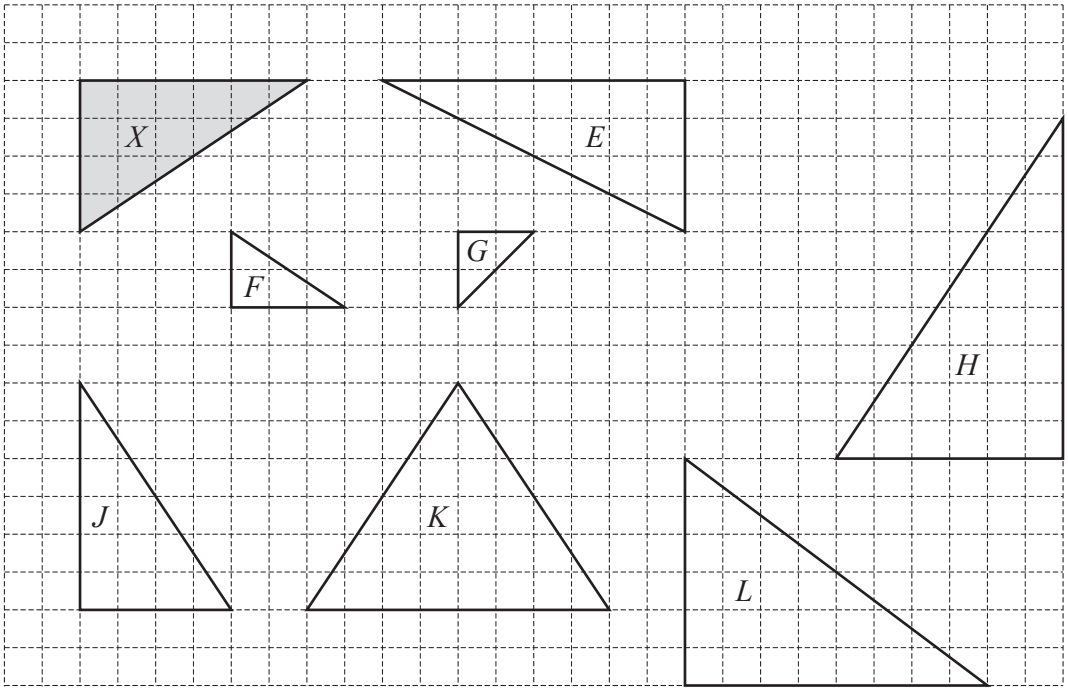
(b) shape B after a reflection in the line $y = -3$. [2]

(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

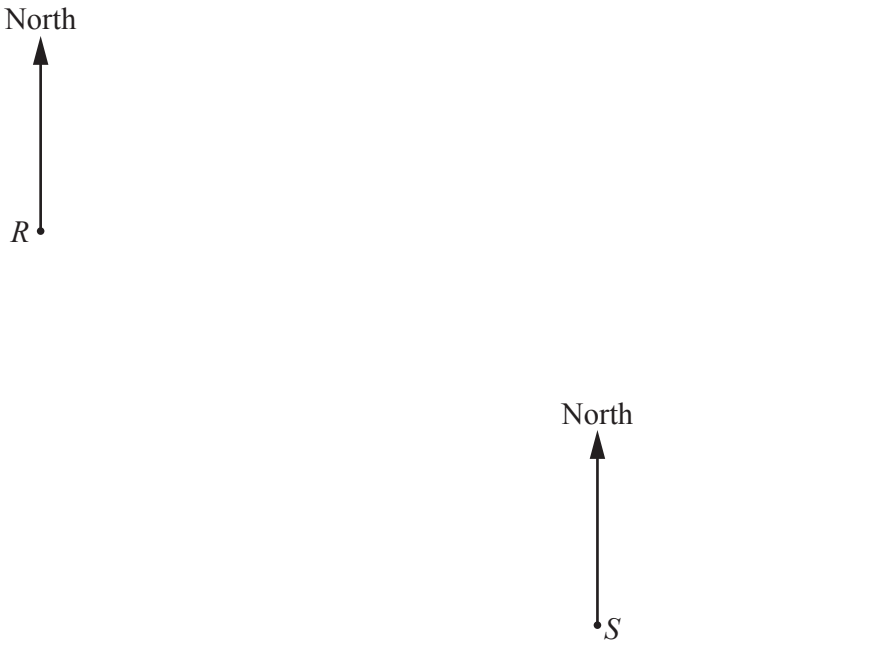
(i) congruent to triangle *X*,

..... [1]

(ii) similar to triangle *X*.

..... [2]

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]

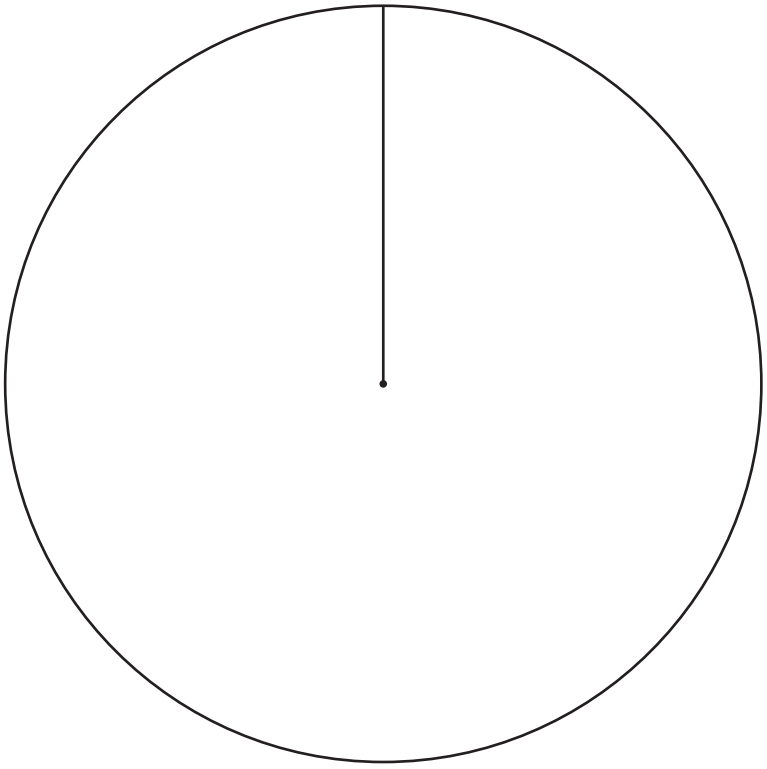
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(b) The treasure is a bag of coins.
The coins are made from three different metals.

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.

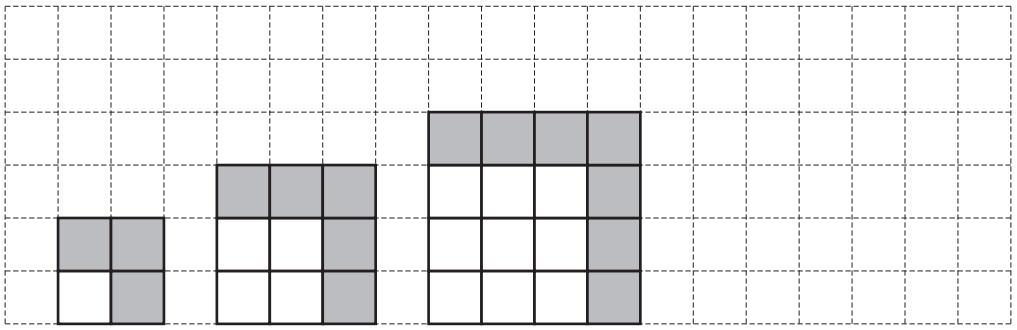


Diagram 1 Diagram 2 Diagram 3 Diagram 4

(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]

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(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]

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

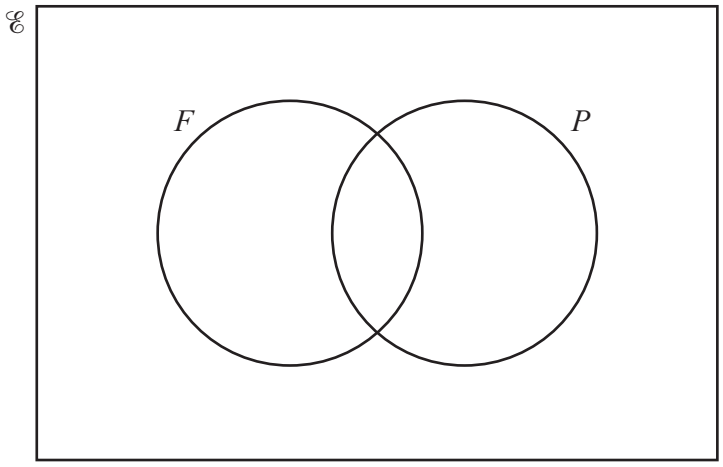
(i) Write down the elements in set F.

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

(ii) Write down the elements in set P.

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

(iii)



(a) Complete the Venn diagram.

[2]

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

..... [1]

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

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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