Cambridge Assessment International Education

# Cambridge IGCSE™

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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 $\pi$, 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 [ ].

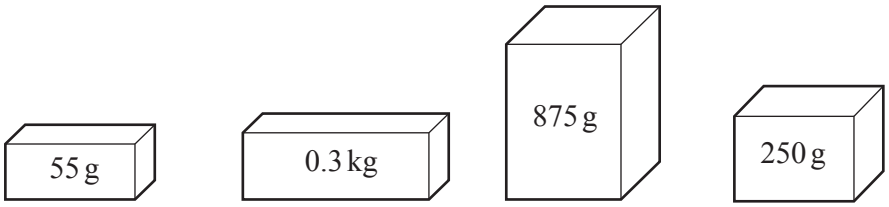
This document has **20** pages. Blank pages are indicated.

**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 | $0 < m \leqslant 60$ | 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

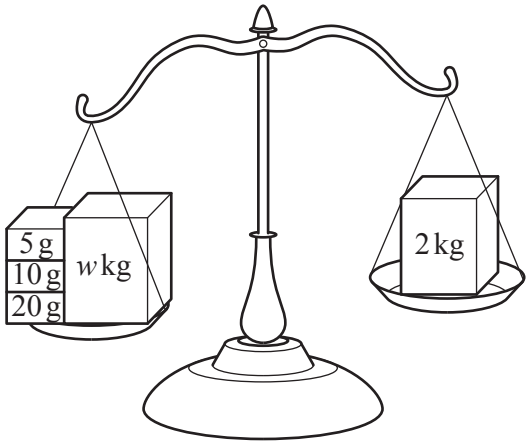
"As the cost of an **Extra large** parcel increases by $0.28 then the cost of a **Large** parcel will also increase by $0.28 to $2.48."

Explain why Avani is incorrect.

.....

..... [1]

**(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 $w$.

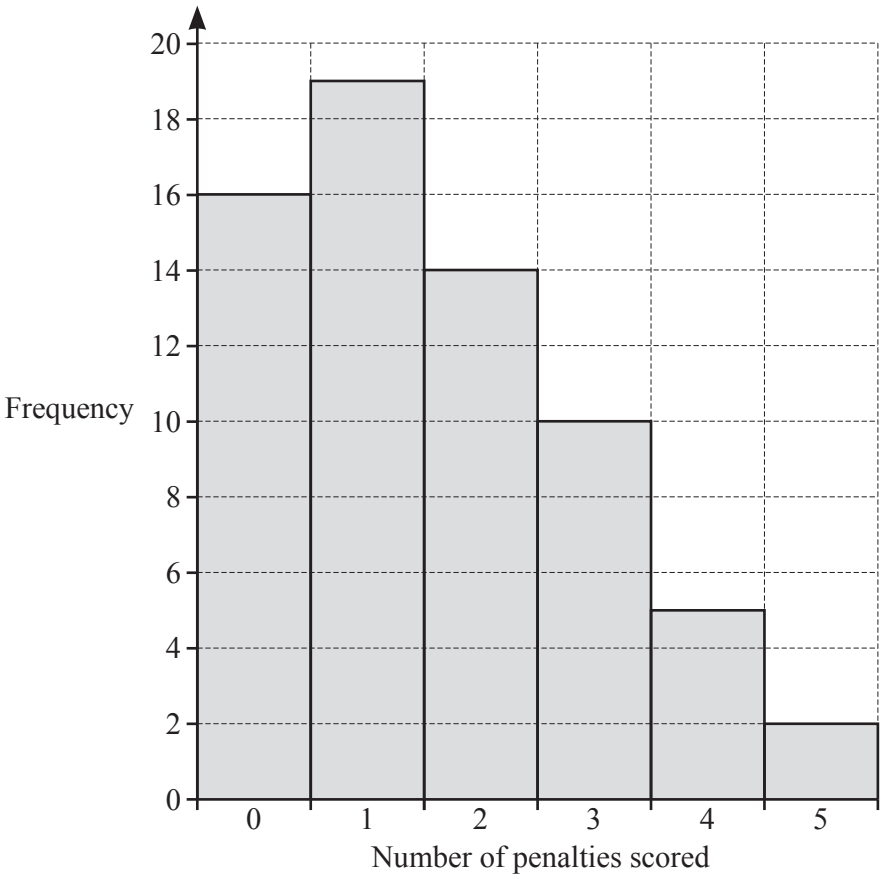
$w =$ ..... [3]

**(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.

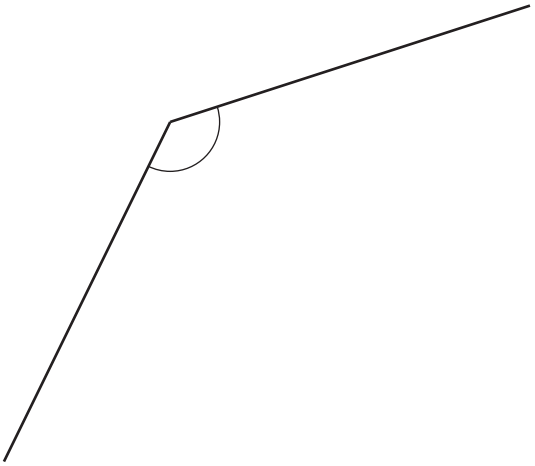
..... % [1]

**(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]

**3 (a)**



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

..... [1]

**(ii)** Measure this angle.

..... [1]

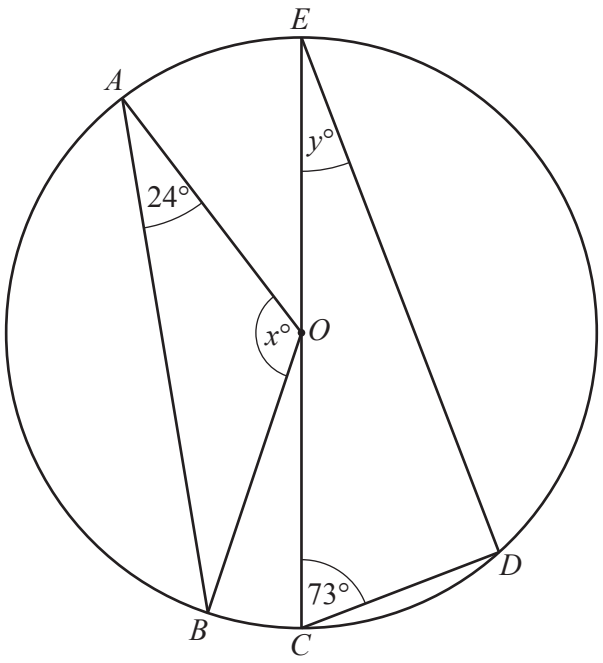
**(b) (i)** Write down the mathematical name for an 8-sided polygon.

..... [1]

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

..... [2]

**(c)**




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.

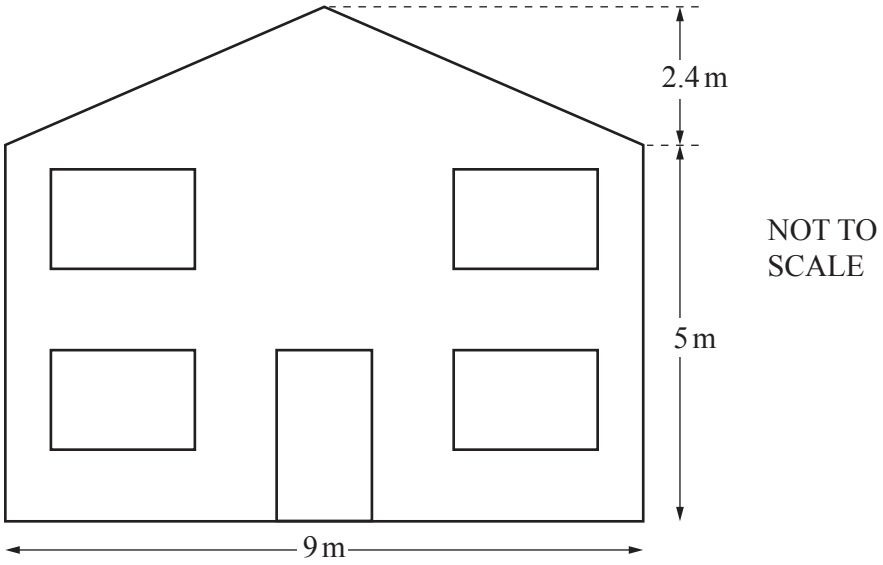
$x =$ ..... because ..... [3]

**(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.

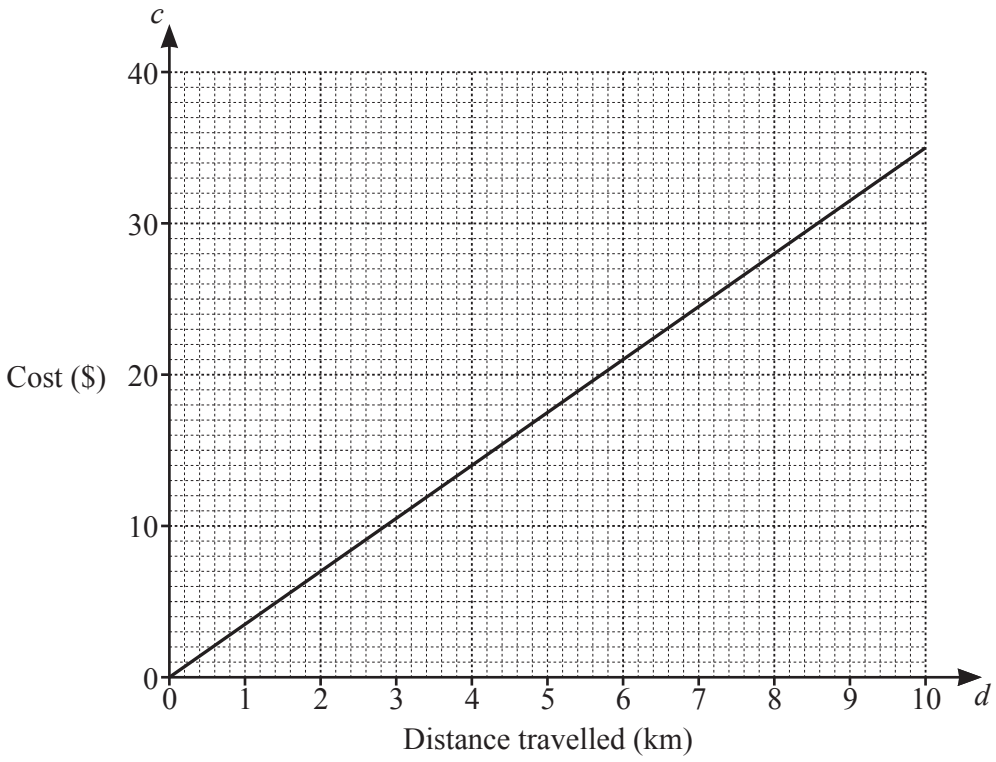
..... $m^2$ [1]

**(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.

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

[1]

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

Write this information as an equation.

..... = .....

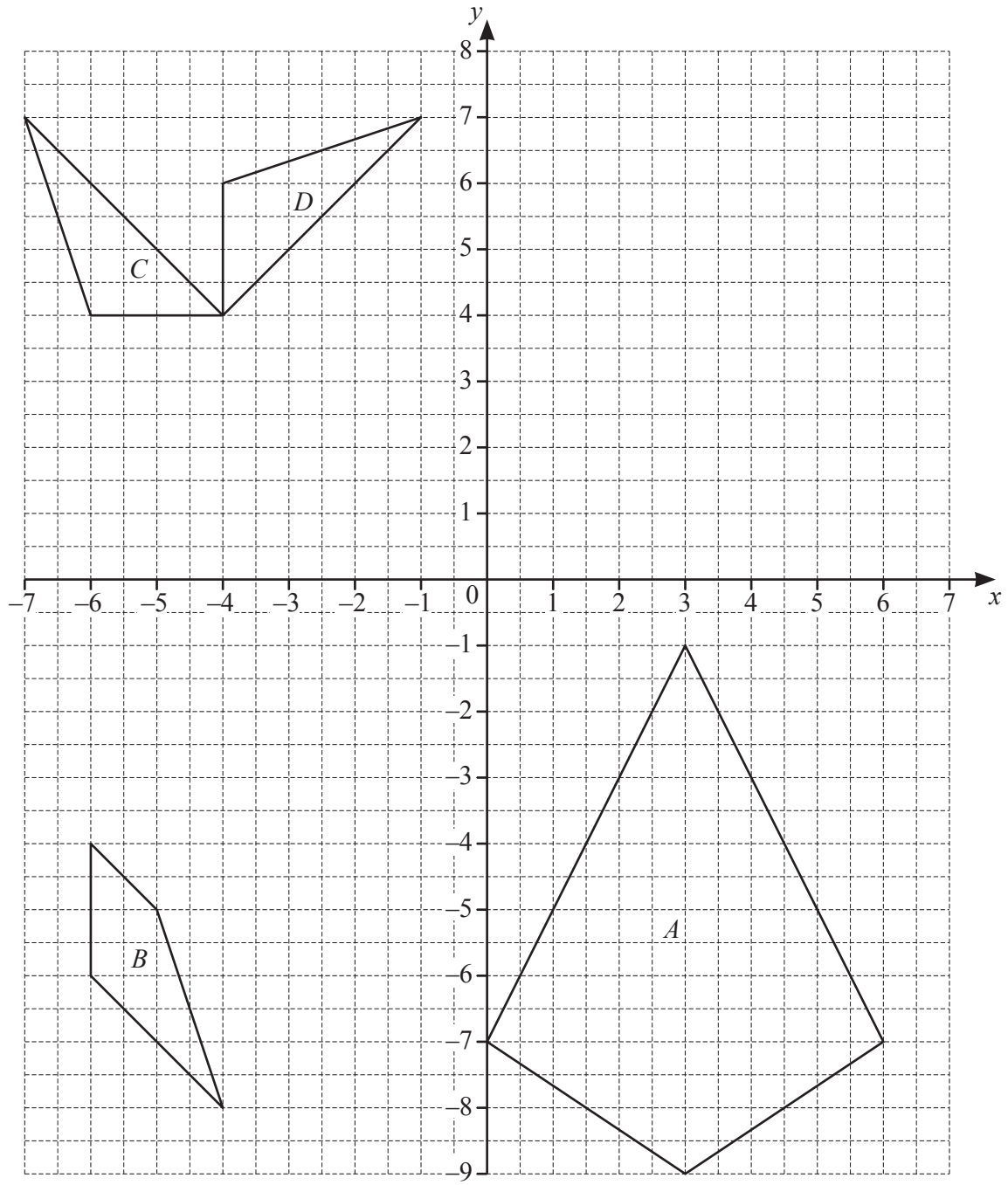
[2]

**(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]

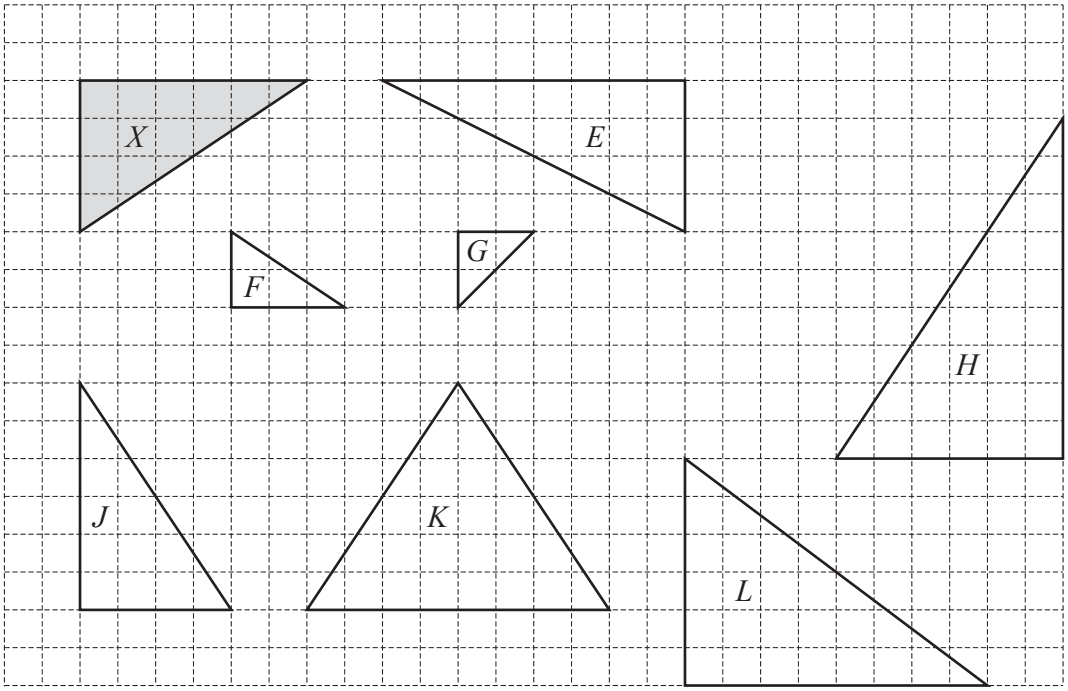
**(b)** shape $B$ after a reflection in the line $y = -3$. [2]

**(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

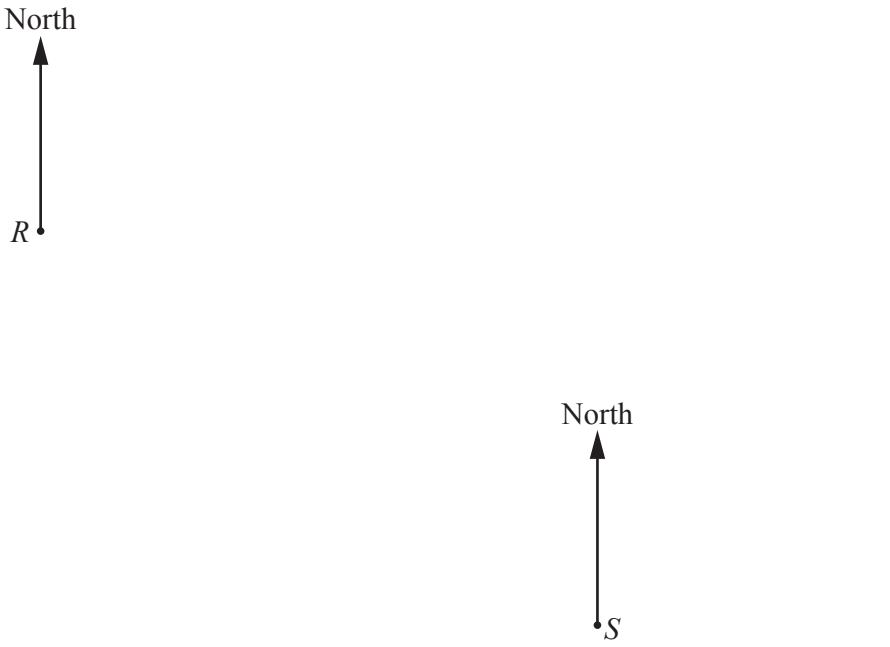
**(i)** congruent to triangle *X*,

..... [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.

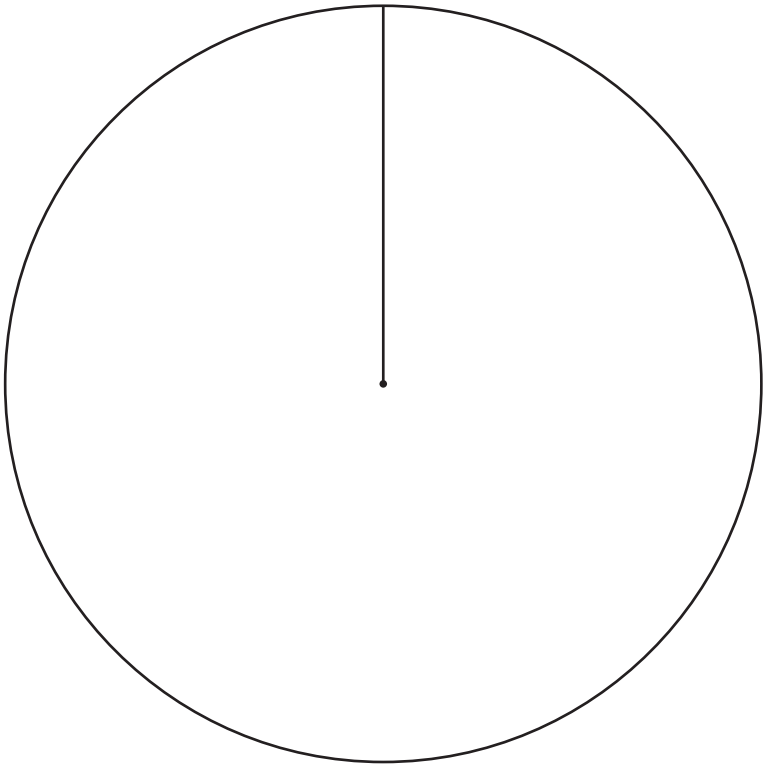
[2]

**(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.

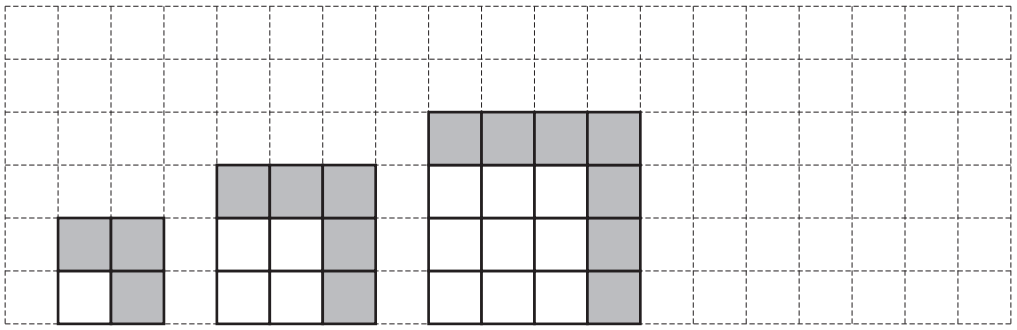


Diagram 1 Diagram 2 Diagram 3 Diagram 4

**(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]

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

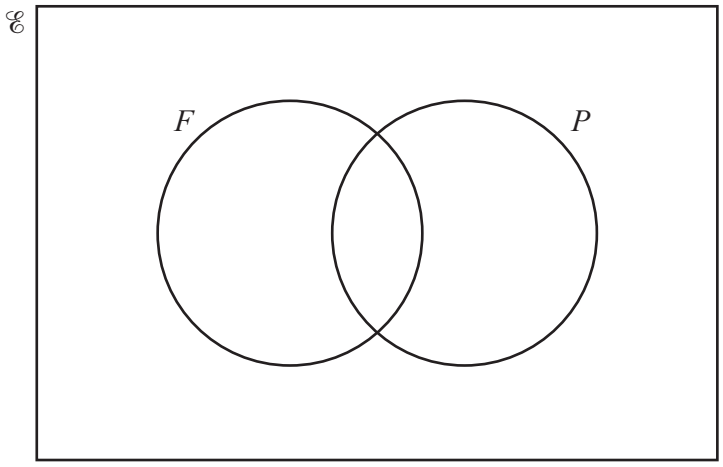
**(i)** Write down the elements in set $F$.

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