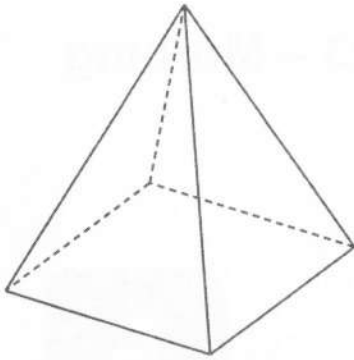


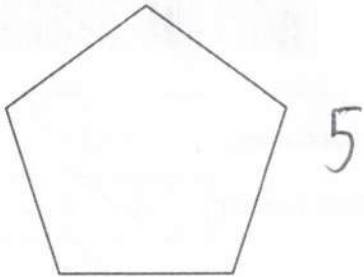
- 1 (a) Write down the mathematical name of this solid.
Choose from the list of names in the box.



cone cube cuboid cylinder
prism pyramid sphere

(a) pyramid ✓ [1]

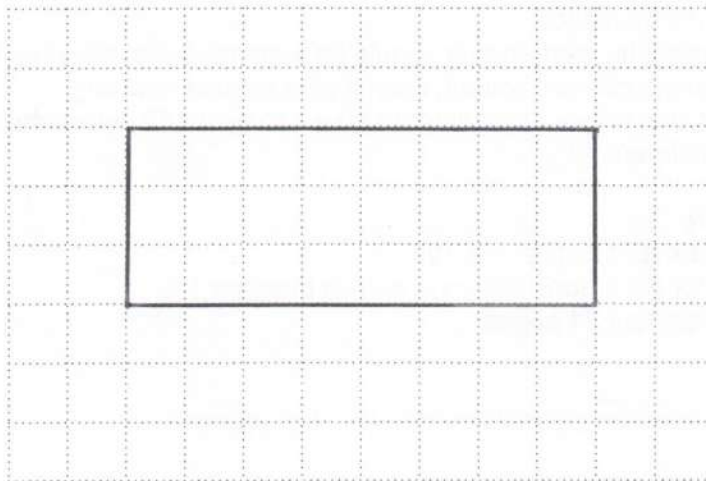
- (b) Write down the mathematical name of this polygon.



(b) pentagon ✓ [1]

- (c) On the grid below, sketch a quadrilateral with these properties.

- All angles are equal = 90
- and
- the diagonals are **not** at right angles to each other. ⇒ NOT a square



✓
ANY
rectangle

[1]

- 2 (a) Round 3648 to the nearest hundred.

3648 ↓

3600 ✓

(a) [1]

- (b) Round £3.2875 to the nearest penny.

3.2875 ↑

3.29 ✓

(b) £ [1]

- 3 (a) What fraction of this shape is shaded?

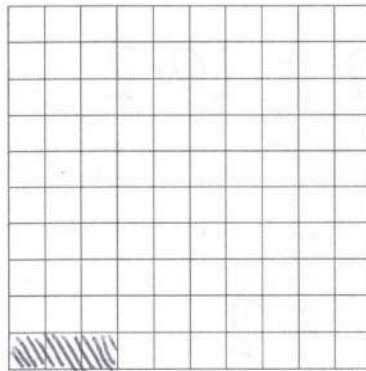


$\frac{3}{5}$ ✓

OE

(a) [1]

- (b) The diagram below is made up of 100 small squares.



Any 3 ✓

Shade 3% of the diagram.

[1]

- 4 (a) Write down the **three** factors of 25.

(a) 1, 5, and 25 ✓ [2]

- (b) Write down a square number between 40 and 70.

(b) 49 or 64 ✓ [1]

- 5 Find the number that is halfway between 4.2 and 6.

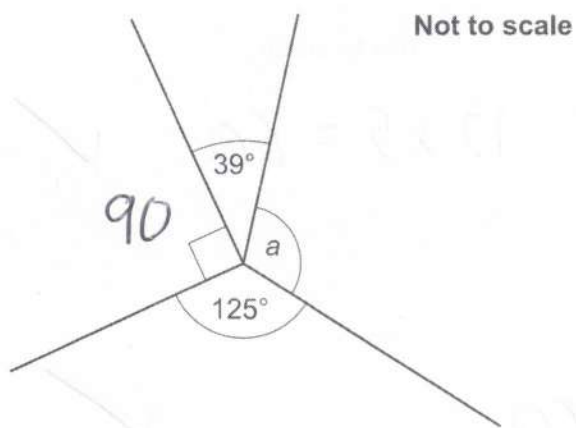
$$6 + 4.2 = 10.2$$

$$10.2 \div 2$$

$$= 5.1 \quad \checkmark$$

..... [2]

- 6 Four lines meet at a point.



Work out the size of angle a .

$$360 - (125 + 90 + 39) \checkmark$$

$$a = \dots\dots\dots 106 \checkmark \dots\dots\dots^\circ [2]$$

- 7 A painter mixes red paint and yellow paint in the ratio 2 : 3.
They make a total of 1.5 litres of paint.

$$= 1500 \text{ ml} \checkmark$$

Work out how much red paint they use.
Give your answer in millilitres.

$$R : Y \\ 2 : 3$$

$$\frac{2}{5} : \frac{3}{5}$$

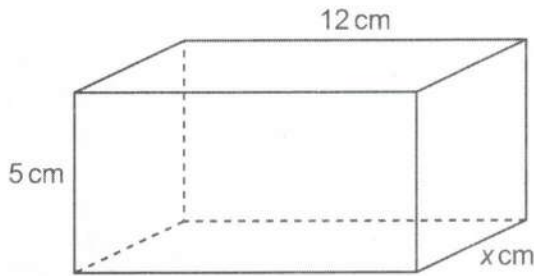
\checkmark

$$\frac{2}{5} \times 1500$$

$$= 600 \checkmark$$

$$\dots\dots\dots \text{ ml } [3]$$

- 8 The diagram shows a cuboid with dimensions 12 cm, 5 cm and x cm.



Not to scale

$$12 \times 5 = 60 \quad \checkmark$$

The volume of the cuboid is 240 cm^3 .

Find the value of x .

$$240 \div 60 \quad \checkmark$$

4

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

- 9 Heidi and Yoshi compete in the same car race. Heidi completes the race in 6 hours. Heidi's average speed was 50 miles per hour. Yoshi's average speed was 48 miles per hour.



Calculate how long it took Yoshi to complete the race. Give your answer in hours and minutes.

(H)

$$T = 6$$

$$S = 50$$

$$D = 6 \times 50$$

$$= 300 \text{ miles } \checkmark$$

(Y)

$$D = 300$$

$$S = 48$$

$$T = \frac{300}{48} = 6 \frac{1}{4} \text{ hrs } \checkmark$$

6

15

$\dots\dots\dots$ hours $\dots\dots\dots$ minutes [4] \checkmark

- 10 Alex and Emma use this recipe to make scones.
The recipe shows the ingredients needed to make **16** scones.

Ingredients to make 16 scones	
400g	flour
50g	sugar
100g	butter
80g	sultanas
70ml	milk
2	eggs

$$24 \div 16 = 1.5$$



- (a) Alex makes **24** scones.

He uses a tablespoon to measure the amount of milk he needs.
The size of a tablespoon is 15ml.

How many tablespoons of milk should Alex use to make **24** scones?

$$70 \times 1.5 = 105 \text{ml}$$



$$105 \div 15 =$$

7



(a) [3]

- (b) Emma has 1 kg of flour and 240g of sultanas.
She has lots of all of the other ingredients.

Work out the maximum number of scones that Emma can make.
You must show your working.

$$\text{Flour: } 1000 \div 400 = 2.5$$

$$\text{Sult: } 240 \div 80 = 3$$

so Flour runs out first

$$16 \times 2.5$$

=

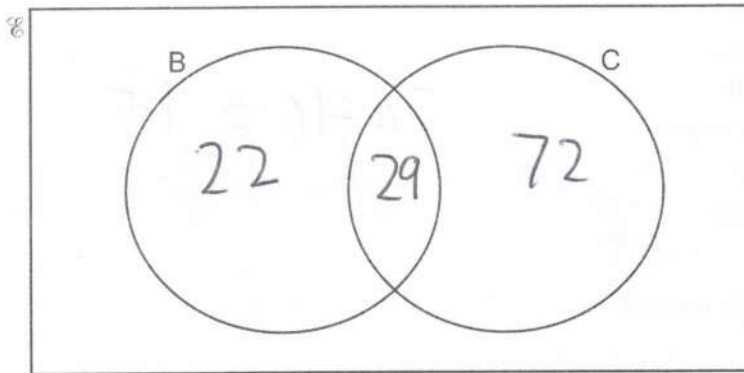
40

(b) [4]

11 140 people are asked if they have a bicycle (B) or a car (C).

- 22 people only have a bicycle.
- 72 people only have a car.
- 29 people have both a bicycle and a car.

(a) Show this information on the Venn diagram.



[1]

(b) (i) How many people do not have a bicycle or a car?

$$140 - 22 - 72 - 29$$

$$= 17$$

(b)(i) [1]

(ii) Write your answer in the correct place on the Venn diagram.

[1]

(c) One of the 140 people is chosen at random.

Work out the probability they have a car.

$$29 + 72 = 101$$

$$\frac{101}{140}$$

(c) [2]

12 The costs to hire a motorhome are shown below.

Motorhome hire	
First day	£130
Each extra day	£ 90
Each mile travelled	60p

Finley hired a motorhome and travelled 560 miles.
The total cost of hiring the motorhome was £916.

Calculate how many days Finley hired the motorhome for.
You must show your working.

$$560 \times 60 = 33600p$$

$$= \pounds 336$$

$$916 - 336 - 130$$

$$= \pounds 450$$

$$450 \div 90 = 5 \text{ extra days}$$

6

..... days [5]

Turn over

13 A climber is in a competition.

Here are their scores after two events.

Event	Score	
1	24	out of 30 points
2	32	out of 38 points
3		out of 52 points

$$\text{Total} = 120 \quad \checkmark$$

Event 3 is out of 52 points.

The climber's overall score is found by adding the three scores together.

Find the score the climber needs in event 3 to achieve 85% of the total points.

$$\frac{85}{100} \times 120 = 102 \text{ pts needed} \quad \checkmark$$

$$102 - 24 - 32 \quad \checkmark$$

$$= 46 \quad \checkmark$$

..... [4]

14 For each graph below, select its possible equation from this list.

A $y = -3$

B $y = x$

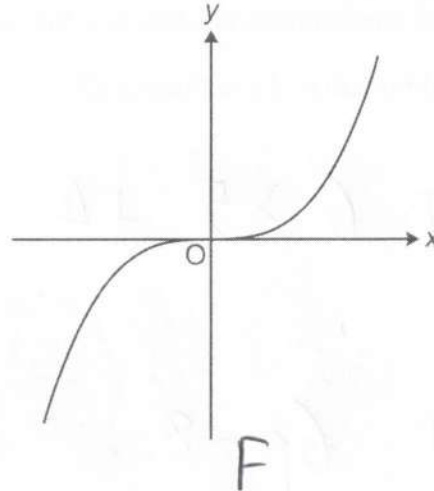
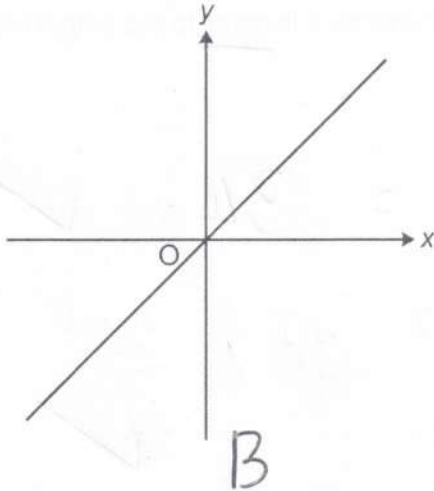
C $y = x + 1$

D $y = x^2$

E $x = -3$

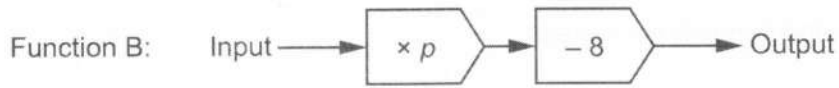
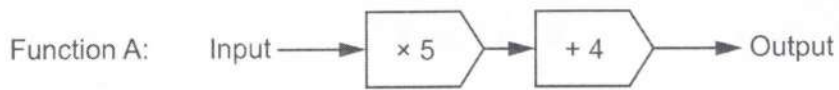
F $y = x^3$

Write the letter of the equation beneath each graph.



[2]

15 Here are two functions.



When the input of each function is 6, the output of Function A is equal to the output of Function B.

Work out the value of p in Function B.

$$\textcircled{A} \quad 6 \times 5 + 4 = 34 \quad \checkmark$$

$$\textcircled{B} \quad 6p - 8 = 34 \quad \checkmark$$

$$6p = 42 \quad \checkmark$$

$$p = 42 \div 6$$

$$p = \dots\dots\dots 7 \checkmark \quad [4]$$

16 (a) Multiply out.

$$5a(2-a)$$

(a) $10a - 5a^2$ ✓ [2]

(b) Solve.

$$5x + 9 > 12$$

$$5x > 3$$

(b) $x > \frac{3}{5}$ ✓ [2]

(c) Solve by factorising.

$$x^2 + 7x + 12 = 0$$

$$(x+4)(x+3) = 0$$

(c) $x = -4$ or $x = -3$ ✓ [3]

17 A prime number is a whole number that has exactly two factors.

(a) Explain why 1 is not a prime number.

..... Only has 1 factor ✓
 [1]

(b) a and b are prime numbers.

Write down the 6 factors of a^2b .

(b) a a^2 b ab a^2b 1 [2]

✓ any 3
 ✓✓ all

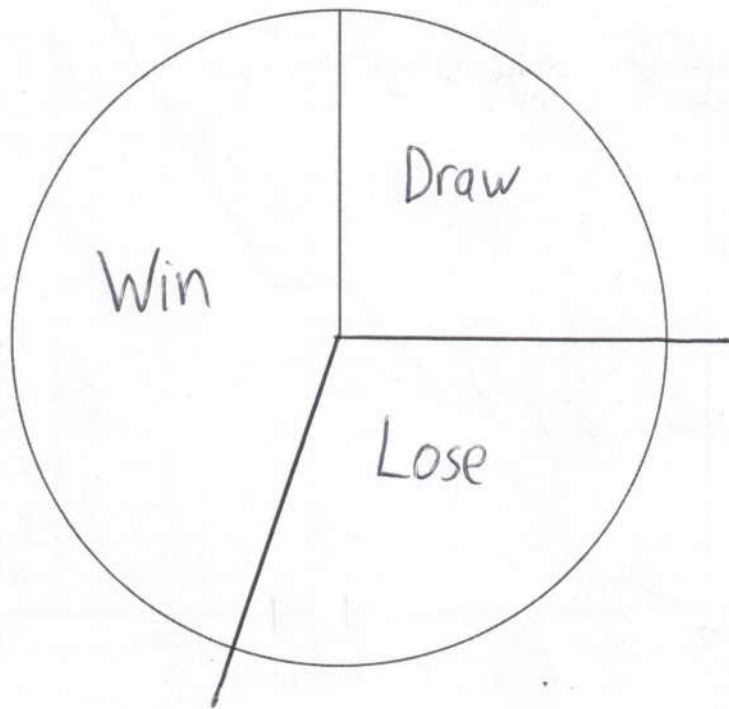
18 (a) The table shows the results for a sports club's 'A' team.

Result	Frequency
Win	18
Draw	10
Lose	12
Total	40

x 9
162
90
108
360

✓
✓

Complete a labelled pie chart to show these results.



[4]

(b) Here are the results for the sports club's 'B' team and 'C' team.

'B' team



'C' team



The 'C' team manager says

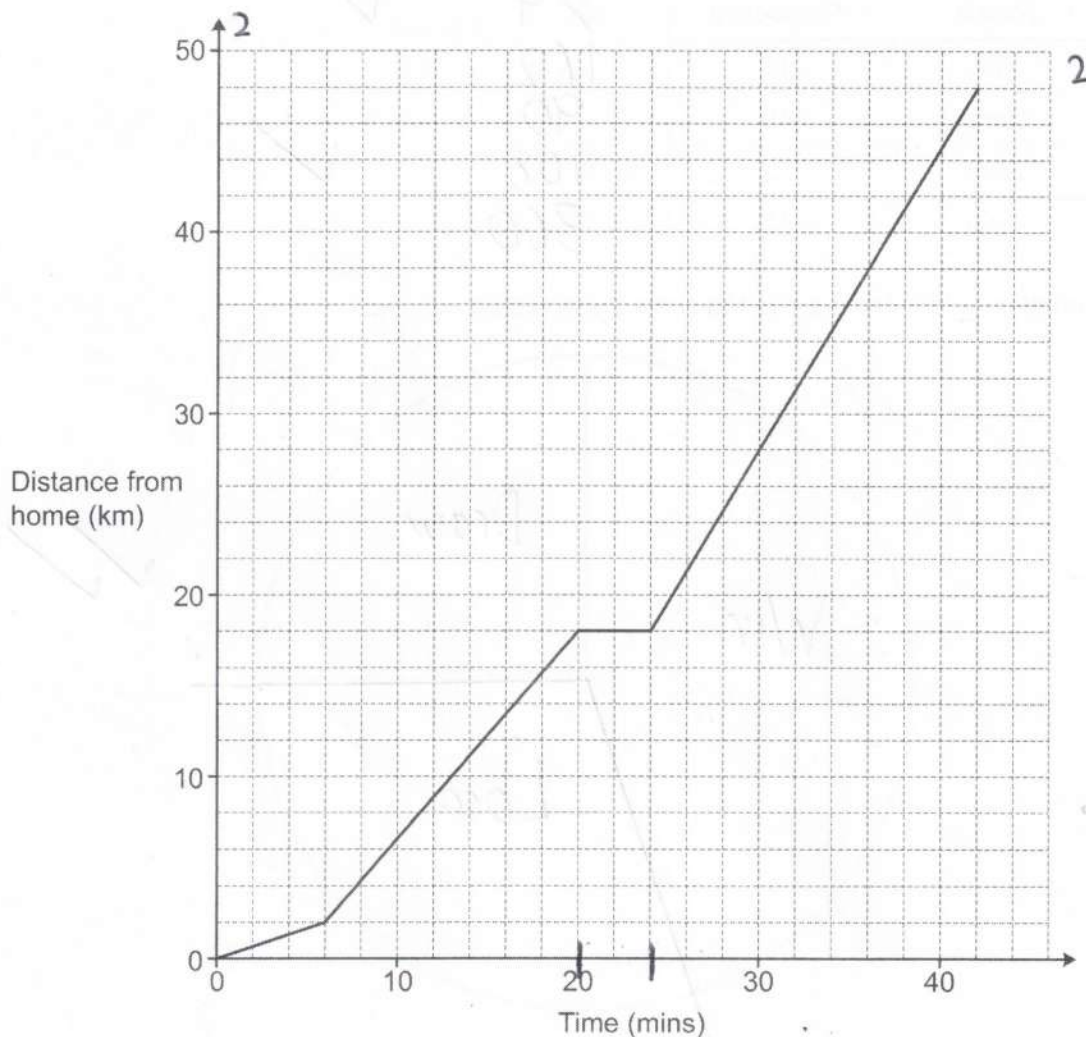
The pie charts show that the 'C' team won more games than the 'B' team.

Referring to the pie charts, explain why the 'C' team manager may not be correct.

Neither shows how many matches either team played.

[1]

- 19 The graph shows Taylor's journey from home to an airport. During the journey Taylor stops for petrol.



- (a) For how long did Taylor stop for petrol?

4

(a) mins [1]

- (b) Taylor drives the same route back home from the airport at an average speed of 45 km/h. Taylor leaves the airport at 22:00.

$D = 48 \text{ km}$

(5)

Work out the time when Taylor arrives home.



$T = 48 \div 45 = 1 \frac{1}{15} \text{ hr} = 1 \text{ hr } 4 \text{ mins}$

23:04

(b) [4]

- 20 (a) Write an expression for the weight, in grams, of an object weighing x kilograms.

(a) $1000x$ ✓ g [1]

- (b) Write an expression for the area, in m^2 , of a garden of area ycm^2 .

$$100 \times 100 = 10000$$

(b) $\frac{y}{10000}$ ✓ m^2 [1]

- 21 (a) A student is using trigonometry to work out an angle, B , in a right-angled triangle.

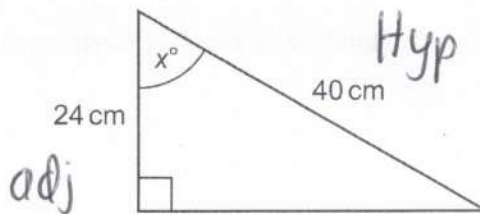
They tell the teacher that $\sin B = \frac{5}{4}$.

Explain why this student must be wrong.

$\sin x$ must be ≤ 1 ✓

[1]

- (b) Here is a right-angled triangle.



Not to scale

Work out the value of x .



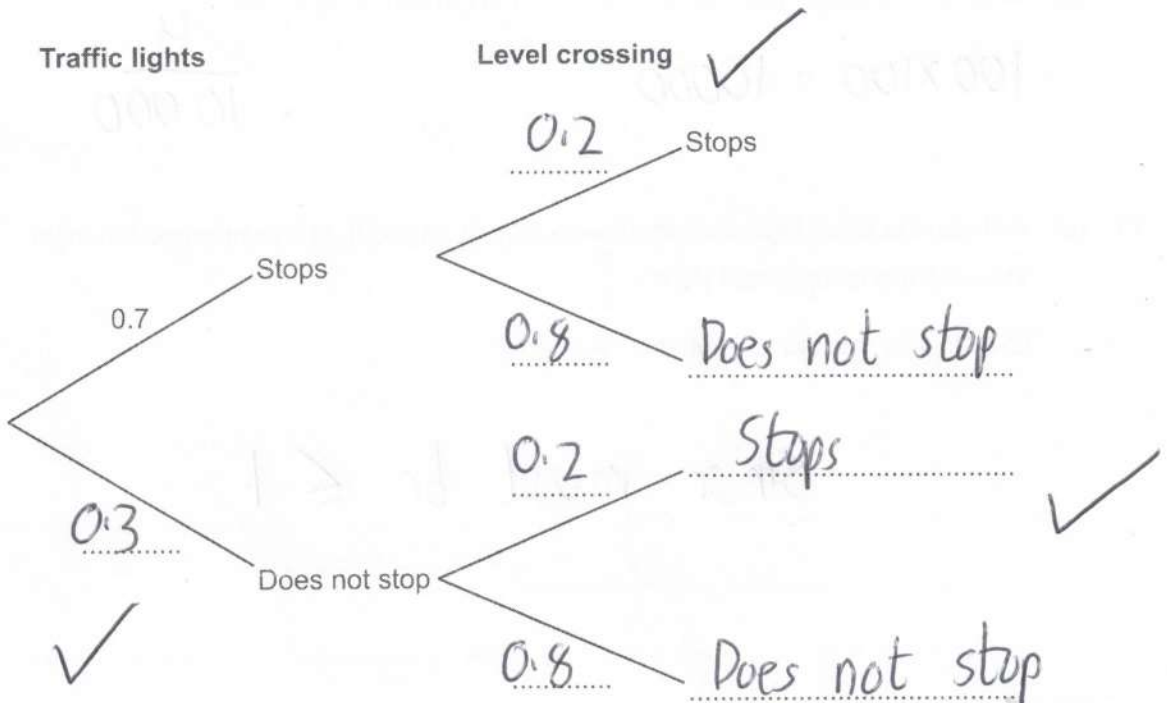
$$x = \cos^{-1}\left(\frac{24}{40}\right)$$

$$= 53.13\dots$$

$x = 53.1^\circ$ ✓ [3]

- 22 On a bus route there is a set of traffic lights and a level crossing.
The probability that the bus stops at the traffic lights is 0.7.
The probability that the bus stops at the level crossing is 0.2.

(a) Use the information to complete the tree diagram.



[3]

- (b) Find the probability that the bus stops at either the traffic lights or at the level crossing but not both.

$$\begin{aligned}
 &SD + DS \\
 &= 0.7 \times 0.8 + 0.3 \times 0.2 \quad \checkmark \checkmark \\
 &= 0.56 + 0.06
 \end{aligned}$$

(b) 0.62 ✓ [3]

- 23 (a) The measurements, in centimetres, of two triangles are shown in the table.

	Side 1	Side 2	Side 3
Triangle 1	2.5	3.2	4
Triangle 2	7	8.96	11.2

Are the two triangles mathematically similar?
Show how you decide.

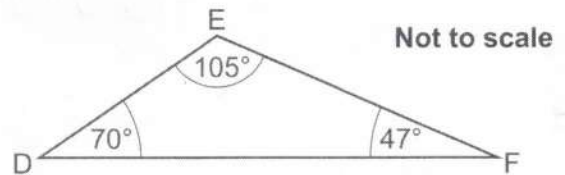
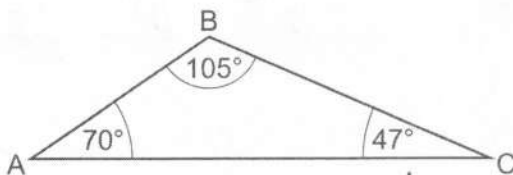
$$\frac{2.5}{7} = \frac{5}{14} \quad \checkmark$$

$$\frac{3.2}{8.96} = \frac{5}{14} \quad \checkmark$$

$$\frac{4}{11.2} = \frac{5}{14} \quad \checkmark$$

Yes because scale factors/ratios are the same [3] ✓

- (b) Are these two triangles definitely congruent?
Give a reason.



No because lengths of sides are unknown / must know at least one side [1] ✓

- 24 2 kg of carrots and 5 kg of potatoes cost £6.36.
3 kg of carrots and 2 kg of potatoes cost £5.25.

Find the cost of 1 kg of carrots and the cost of 1 kg of potatoes.
You must show your working.

$$\begin{aligned} 2c + 5p &= 6.36 && \textcircled{\times 3} \\ 3c + 2p &= 5.25 && \textcircled{\times 2} \end{aligned}$$

$$\begin{array}{r} 6c + 15p = 19.08 \\ - 6c + 4p = 10.50 \\ \hline 11p = 8.58 \\ \hline p = 0.78 \end{array}$$

$$\Rightarrow 3c + 2 \times 0.78 = 5.25$$

$$3c = 3.69$$

$$c = 1.23$$

1 kg of carrots cost £ 1.23

1 kg of potatoes cost £ 0.78

[5]

- 25 Riley and Sam are conducting surveys.
They are both given the same list of 12463 people from which to select their sample.

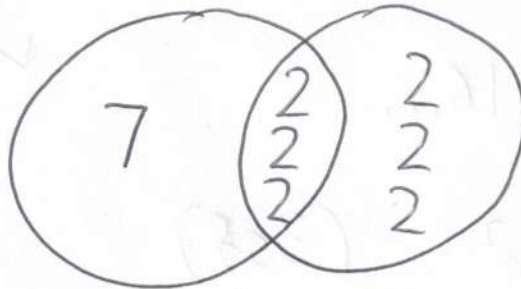
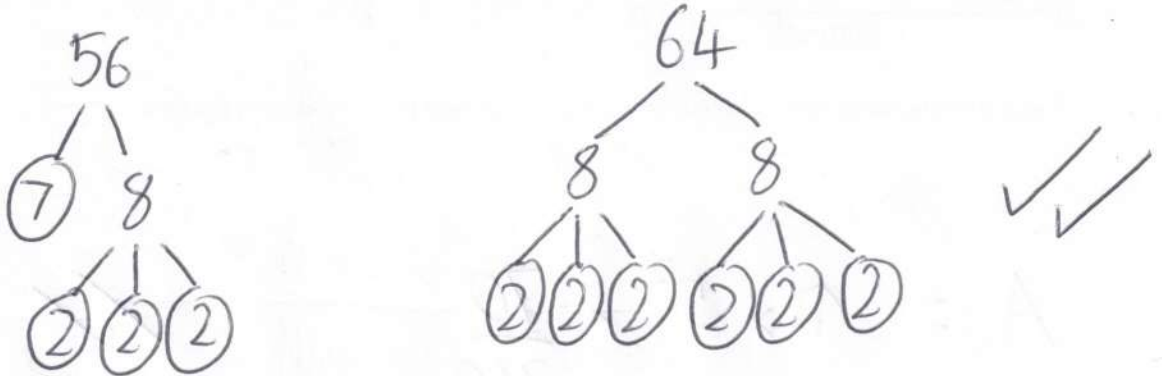
Riley selects every 56th person.

Sam selects every 64th person.

They both start counting from the first name in the list.

Work out how many people will be selected to be in both surveys.

You must show your working.



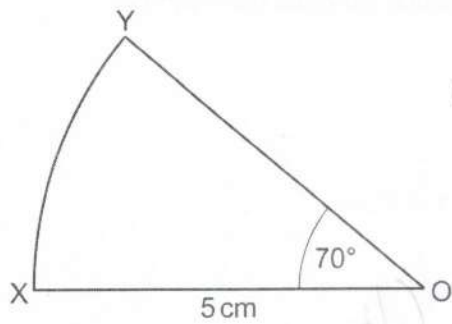
$$\text{LCM} = 7 \times 8 \times 8 = 448 \checkmark$$

$$12463 \div 448 = 27.8... \checkmark$$

27 ✓

[5]

26 XOY is a sector of a circle, centre O.



Not to scale

Show that the area of the sector is 15.3 cm^2 , correct to 3 significant figures.

[3]

$$A = \pi \times 5^2 \times \frac{70}{360} \quad \checkmark \checkmark$$

$$= 15.2716\dots \quad \checkmark$$

$$= 15.3 \text{ cm}^2 \quad (3 \text{ sf})$$

END OF QUESTION PAPER