Answer **all** the questions.

1 **(a)** Work out.

(i) £4.25 + £5.18

(a)(i) £ 9.43 **[1]**

(ii) -8 + 11

(ii) 3 **[1]**

(iii) -6 × -9

(iii) 54 **[1]**

(b) Use one of these symbols <, > or = to make each statement true.

(i) 4.5 ..... > ..... 4.34 **[1]**

(ii) $\frac{3}{4}$ ..... < ..... 0.8 **[1]**

(iii) $\frac{3}{5}$ ..... = ... 0.6 **[1]**

2 By rounding each value to one significant figure, estimate the cost of 3.9kg of apples at 87p per kg.

4 × 90p = 360p

= £3.60

£ 3.60 **[2]**

3 **(a)** Complete each statement.

(i) $\frac{3}{7} = \frac{..12..}{28}$ **[1]**

(ii) $4\frac{1}{2} = \frac{.....9.....}{2}$ **[1]**

(b) Work out.

$\frac{2}{3} - \frac{1}{5}$

$\frac{2}{3} = \frac{10}{15}$. $\frac{1}{5} = \frac{3}{15}$ $\Rightarrow \frac{2}{3} - \frac{1}{5}$

(b) ..... $\frac{7}{15}$. ..... **[2]**

4 Work out.

(a) 0.7×0.3

(a) .....0.21..... **[1]**

(b) $0.48 \div 6$

(b) .....0.08..... **[1]**

5 **(a)** Complete the following.

(i) $5^2 =$ .....25..... **[1]**

(ii) $\sqrt[3]{64} =$ .....4..... **[1]**

(b) Work out $2^3 \times \sqrt{49}$.

$2^3 = 8$. $\sqrt{49} = 7$.

$8 \times 7 =$

(b) .....56..... **[2]**

6 Here is a function machine.

(a) (i) Find the output when the input is 7.

(a)(i) ..... 32 ..... **[1]**

(ii) Find the input when the output is 42.

$\frac{42+3}{5} = 9$

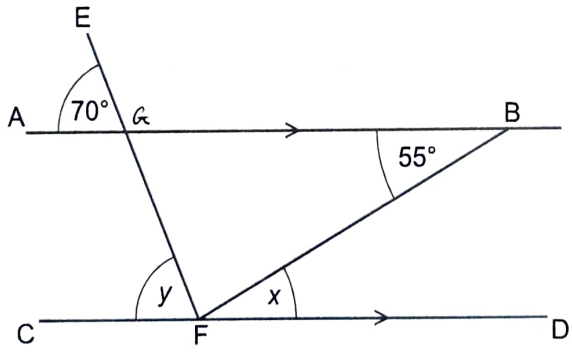
(ii) ..... 9 ..... **[2]**

(b) The input is x and the output is y.

Write an equation for y in terms of x.

(b) ..... $y = 5x - 3$ ..... **[2]**

7 AB and CD are parallel lines.
EF and FB are straight lines.



Not to scale

Complete the following statements.

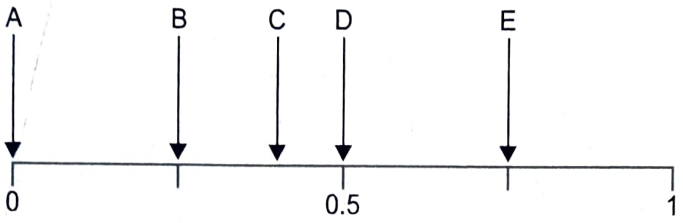
$x = 55°$ because ..... alternate angles (with ABF) .....

$y = 70°$ because ..... corresponding angles (with A'G'E) ..... **[2]**

8 Darren has these 20 crayons in a box:

- 8 blue
- 4 red
- 5 black
- 3 green.

(a) He chooses a crayon at random from the box.



Which arrow shows the probability that this crayon is

(i) blue,

(a)(i) Arrow ..... C ..... **[1]**

(ii) yellow,

(ii) Arrow ..... A ..... **[1]**

(iii) **not** black.

(iii) Arrow ..... E ..... **[1]**

(b) Darren buys 16 more crayons that are either blue or red.
He puts these in the box with the 20 crayons he already has.

He now picks a crayon at random from the box.
The probability that he picks a **blue** crayon is evens.

How many **red** crayons did he buy?

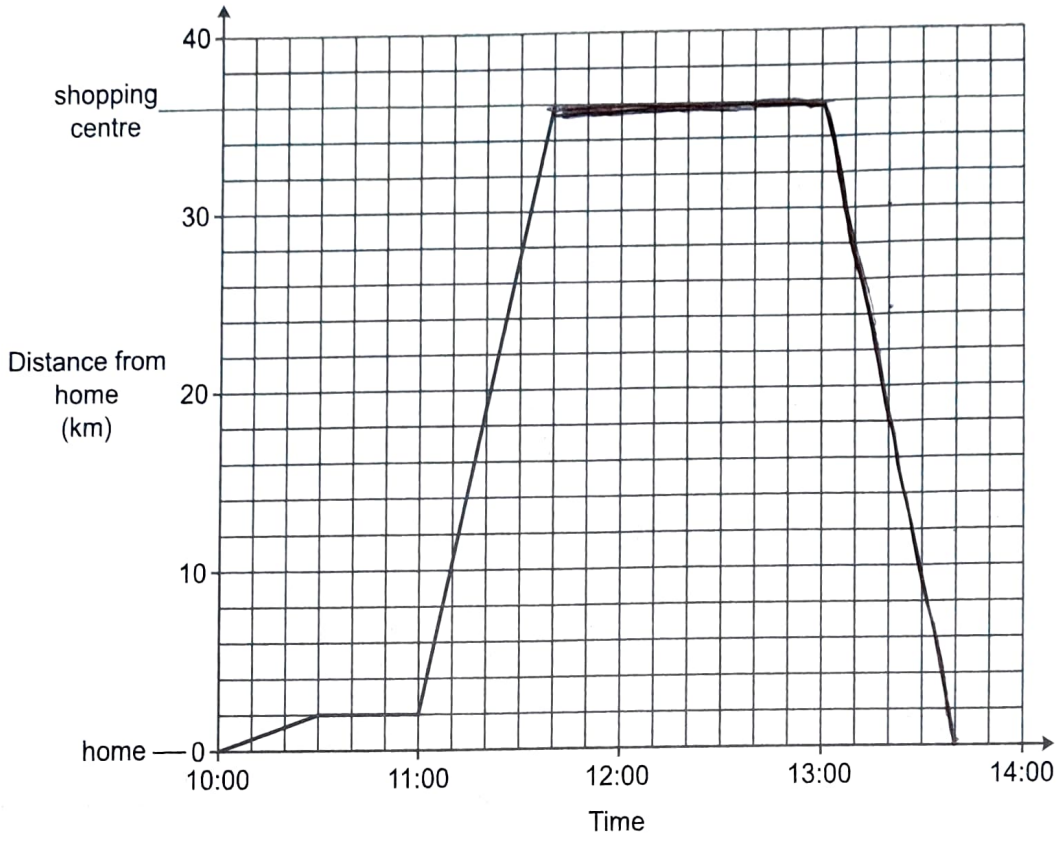
16 + 20 = 36 total.

⇒ 18 blue (after) ⇒ 10 blue (added)

⇒ 6 red (added)

(b) ..... 6 ..... **[3]**

9 The graph shows Sarah's journey from her home to a shopping centre.



(a) State an assumption that has been made when the graph was drawn.

She travels at constant speeds.

..... **[1]**

(b) What is the distance from Sarah's home to the shopping centre?

(b) 36 km **[1]**

(c) Between which two times did Sarah stop?
Explain how the graph shows this.

From 10:30 to 11:00 shown on the graph by the distance from home staying constant.

..... **[2]**

(d) **(i)** Sarah stays at the shopping centre until 13:00.
She then travels home without stopping.
Her journey home takes 40 minutes.

Complete the graph to show this information. **[3]**

(ii) Work out Sarah's average speed for her journey home.
Give your answer in kilometres per hour.

$\frac{36 \text{ km}}{0.6 \text{ hr}} =$

(d)(ii) ..... 54 ..... km/h **[3]**

10 **(a)** Simplify fully.

(i) $3t + 5u - 2t + 3u$

(a)(i) ..... $t + 8u$ ..... **[2]**

(ii) $6a \times 2a^2$

(ii) ..... $12a^3$ ..... **[2]**

(b) Make x the subject of the formula $y = x^2 - 1$.

$y = x^2 - 1$

$y + 1 = x^2$

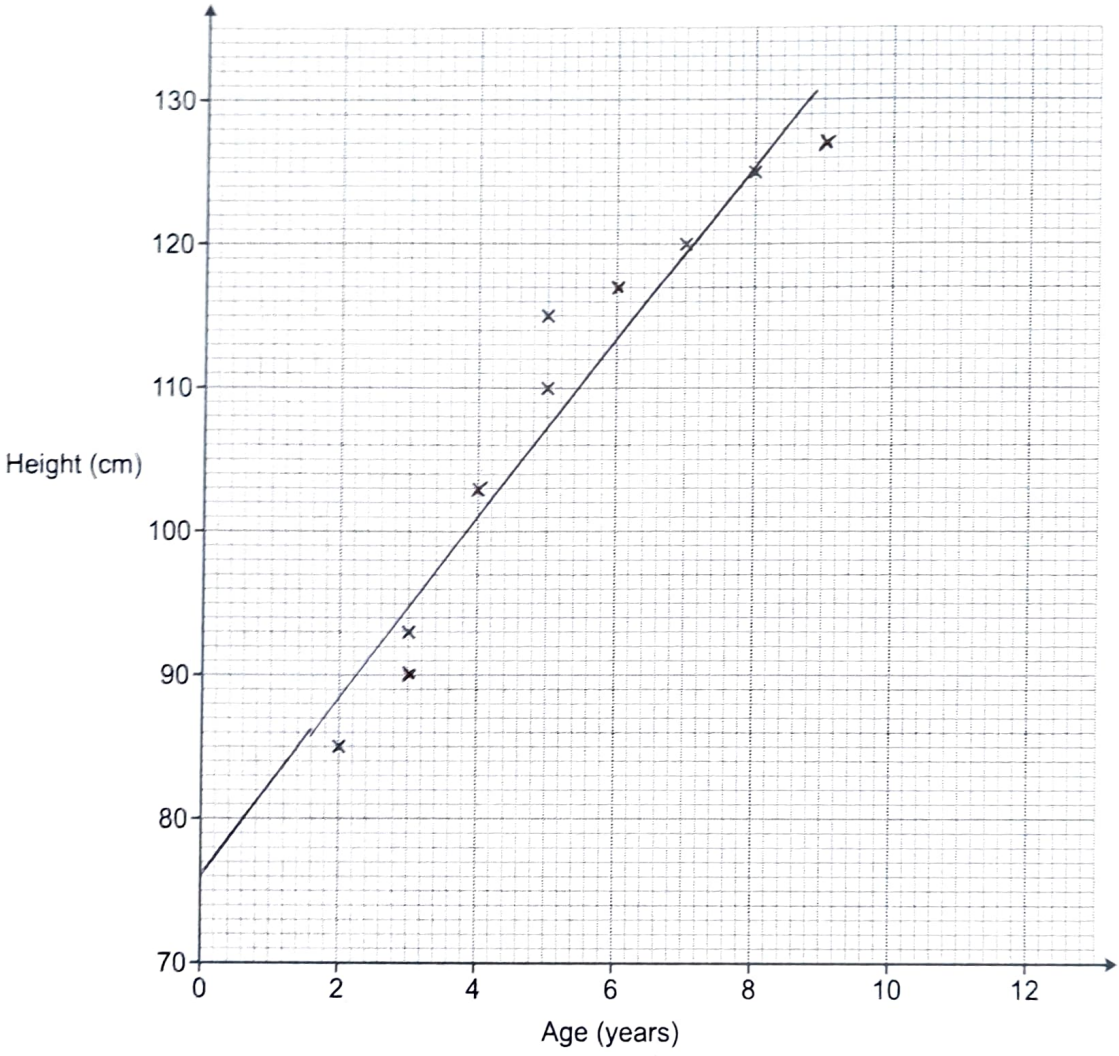
$x = \sqrt{y+1}$.

(b) ..... $x = \sqrt{y+1}$ ..... **[2]**

11 A doctor records the ages, in years, and the heights, in centimetres, of 10 girls.

Age (years)	2	5	3	7	5	8	3	6	9	4
Height (cm)	85	115	93	120	110	125	90	117	127	103

The points for the first six girls are plotted on the scatter diagram.



(a) Plot the points for the remaining four girls. **[2]**

(b) Describe the type of correlation shown in the scatter diagram.

Positive. **[1]**

(c) The doctor says that by using a line of best fit on the scatter diagram, the height of a 6-year-old girl is around 95 cm.

Does the scatter diagram support the doctor's statement?
Explain your reasoning.

No, the point (6, 95) is far below the line of best fit. **[2]**

(d) Explain why the scatter diagram and line of best fit should not be used to estimate the height of a 12-year-old girl.

The graph is plotted for ages 2 - 9. The trend may not hold beyond here. **[1]**

12 Kate is 5 feet 2 inches tall.
Alice is 1.57 metres tall.
Alice says that she is taller than Kate.

Use the conversions below to decide if Alice is correct.

12 inches = 1 foot 1 inch = 2.5 centimetres

5ft 2" = 62".

62 × 2.5 = 155 cm = 1.55m < 1.57m

Alice is correct **[4]**

13 Rashid is making cupcakes using these ingredients.

Cupcake ingredients

Makes 20 cupcakes

120 g flour

140 g butter

4 eggs

60 g cocoa powder

50 ml of water

(a) How many eggs does he need to make 60 cupcakes?

(a) 12 **[1]**

(b) How much butter is needed to make 5 cupcakes?

$\frac{20}{5} \rightarrow \frac{140}{4} =$

(b) 35 g **[2]**

(c) Rashid has 210 g of cocoa powder and plenty of the other ingredients.
He says that he can make at least 75 cupcakes.

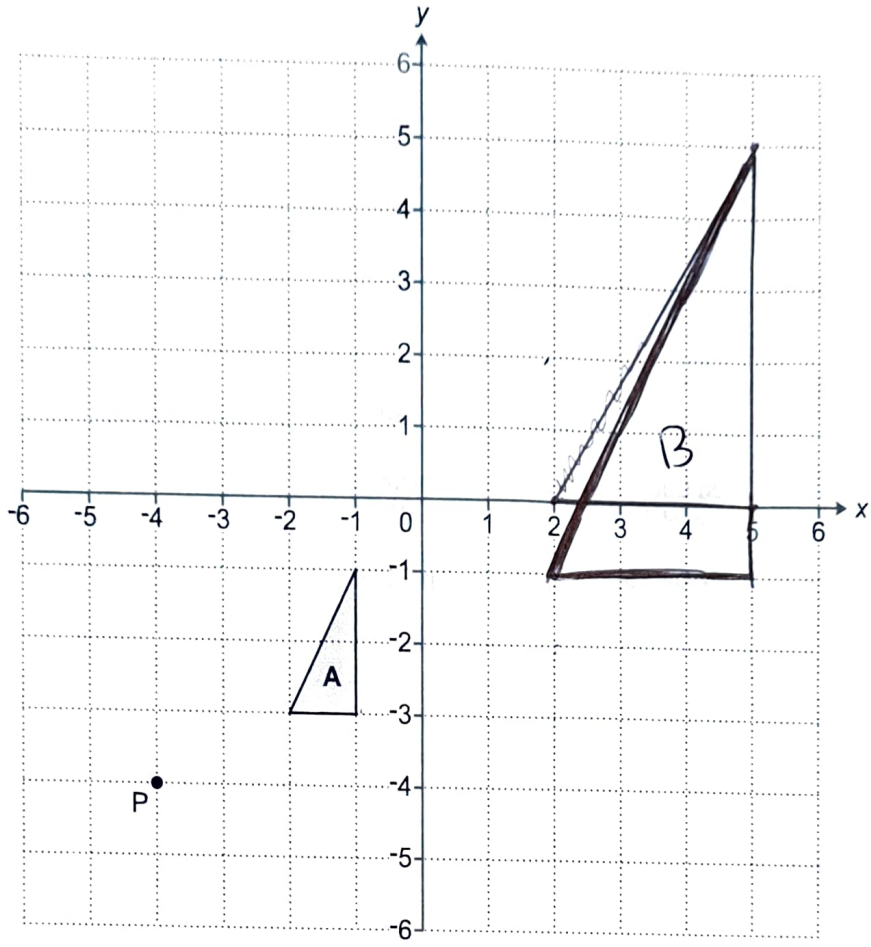
Is he correct?
Explain your reasoning.

$\frac{210}{60} = 3.5.$

$3.5 \times 20 = 70 < 75.$

No, he can only make 70. **[3]**

14 Triangle **A** is drawn on the grid below.



(a) Enlarge triangle **A** with scale factor 3 from the centre of enlargement P.
Label the image **B**. **[3]**

(b) Describe fully the **single** transformation that maps triangle **B** onto triangle **A**.

Enlargement with scale factor ⅓, about the centre of enlargement (-4,-4). **[3]**

15 Ed has a card shop.

(a) He buys a particular card for £1.20 and sells it for £1.68.

Calculate his percentage profit on this card.

$\frac{1.68 - 1.2}{1.2} \times 100 = 40$ %.

(a) 40 % **[3]**

(b) Ed's profit on "Good Luck" cards in 2018 was £360.
This was a decrease of 20% on his profit in 2017.

Work out Ed's profit on "Good Luck" cards in 2017.

$\frac{360}{0.8} =$

(b) £ 450 **[3]**

16 **(a)** A sunflower grows at a rate of 4 cm each day.

How many days does it take to grow from a height of 80 cm to more than 1.06 m?

1.06m = 106cm.

$\frac{106 - 80}{4} = 6.5 \rightarrow 7$

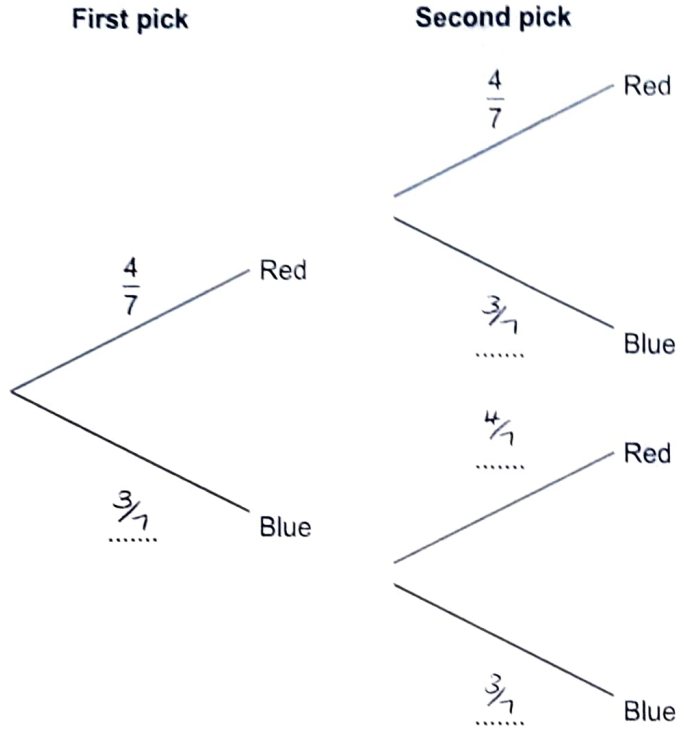
(a) 7 **[3]**

(b) If the sunflower grows at a faster rate, how would this affect your answer to part **(a)**?

It would take fewer days. **[1]**

17 A bag contains 4 red counters and 3 blue counters only.
Jack picks a counter at random and then replaces it.
Jack then picks a second counter at random.

(a) Complete the tree diagram.



[2]

(b) Work out the probability that Jack picks two red counters.

$\frac{4}{7} \times \frac{4}{7} = \frac{16}{49}$

(b) $\frac{16}{49}$ **[2]**

18 Adam buys some theatre tickets in a sale.

The normal prices are:

£80 for each adult
£40 for each child.

In the sale, the prices are reduced by 15%.
Adam buys 2 adult tickets and 1 child ticket at the sale price.
A 2% booking fee is then added to the total cost of the tickets.

Calculate the total amount that Adam must pay.

80 + 80 + 40 = 200.

200 × 0.85 = 170.

170 × 1.02 = 173.40.

£ 173.40. **[6]**

19 One day, a group of people had a driving test.
40 of this group were men and the rest were women.
$\frac{3}{5}$ of the men and $\frac{2}{3}$ of the women passed the driving test.
The number of men and women that passed the driving test was the same.

Work out the number of women that took the driving test that day.

$\frac{3}{5}m = \frac{2}{3}w$

$m = 40 \Rightarrow \frac{2}{3}w = 24.$

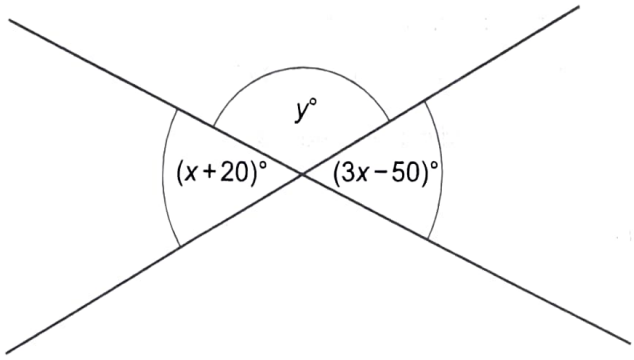
$\Rightarrow w = \frac{3}{2} \times 24 = 36.$

36

..... **[5]**

Turn over for question 20

20 The diagram shows two intersecting straight lines.



Not to scale

Find the value of y.

$x + 20^\circ = 3x - 50^\circ$

$\Rightarrow 2x = 70^\circ$

$\Rightarrow x = 35^\circ$.

$y + x + 20^\circ = 180^\circ$

$\Rightarrow y = 125^\circ$

$y =$ 125° **[6]**

END OF QUESTION PAPER