GCSE Mathematics - Paper 3 (Foundation tier)

J560/03 Paper 3 Mathematics (Foundation Tier)

Question Set 3

1

(a) Here are some types of number.

An even number	An odd number	A prime number	A square number	A cube number

From the list, write down the type of number being described.

(i) A number that does **not** divide exactly by 2. An odd number ..... **[1]**

(ii) A number that has no factors except itself and 1. A prime number ..... **[1]**

(b) **(i)** Write down all the multiples of 4 between 21 and 29.

20 . 24, 28 . . 32

(b)(i) 24, 28 ..... **[1]**

(ii) Write down a common multiple of 4 and 6.

$4 \times 6 = 24$

(ii) 24 ..... **[1]**

(c) Insert brackets to make this calculation correct.

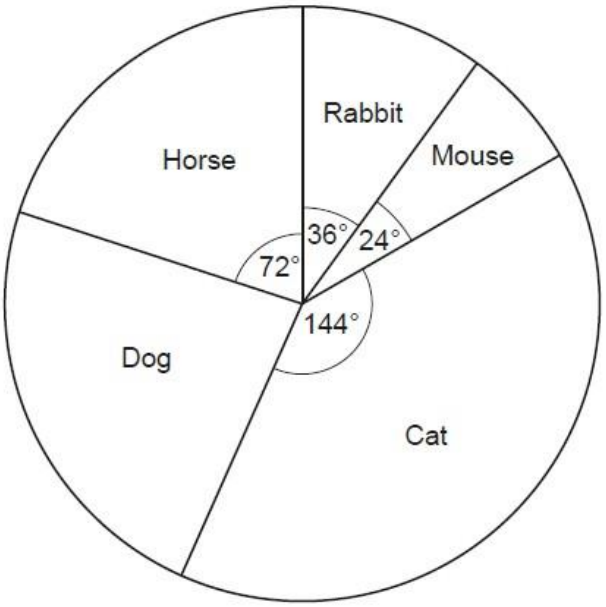
$(4 - 1) \times 2 = 6$ 4-1=3 3x2=6 **[1]**

(d) Write 7% as a fraction.

7/100

(d) 7/100 ..... **[1]**

2 30 students each own one pet.
The pie chart shows the proportion of each type of pet owned by the 30 students.



(a) Which type of pet is the mode?

mode = most

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

Use the information in the pie chart to complete this bar chart

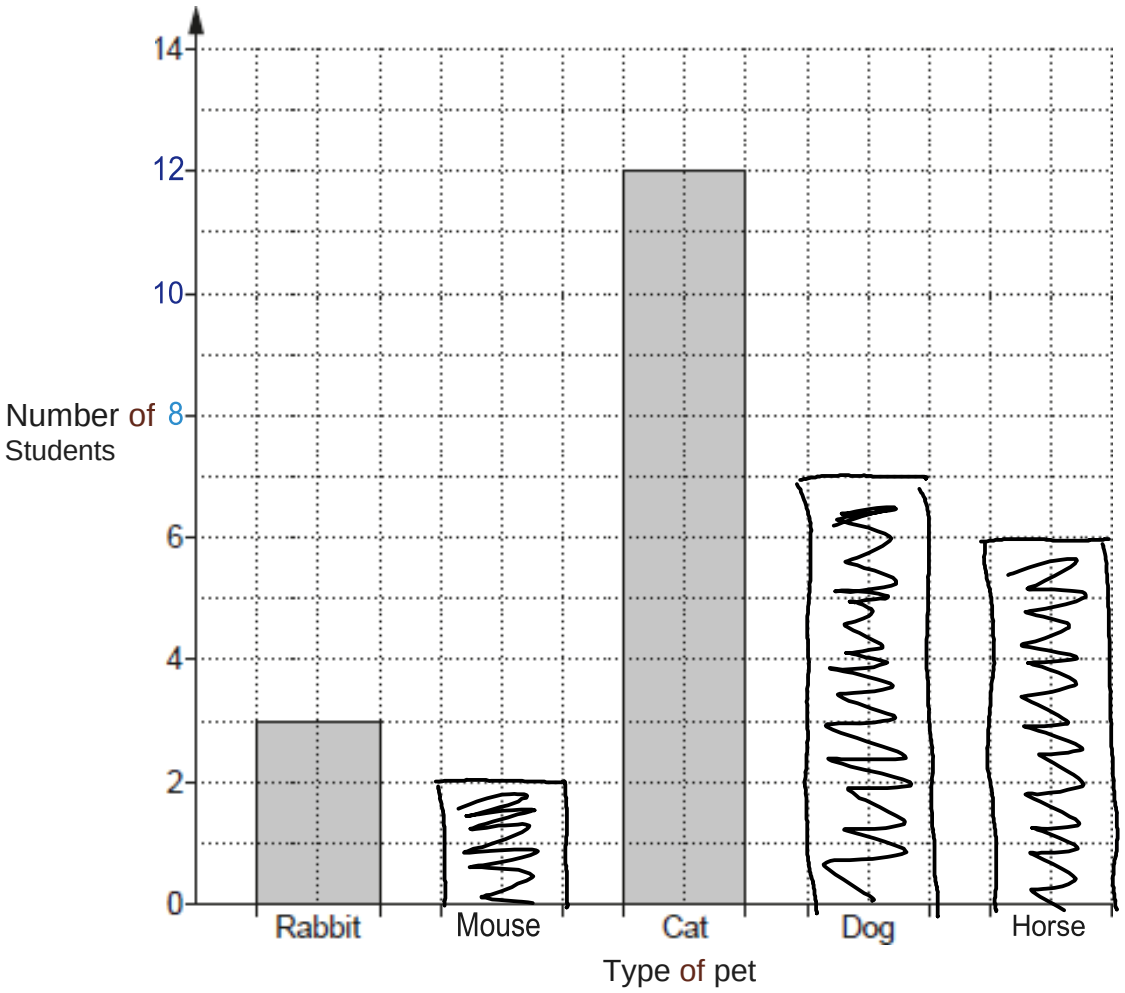
cat $= 144^\circ = 12$

$\frac{144^\circ}{12} = 12$ so $1 = 12^\circ$

Mouse $= 24^\circ = \frac{2}{}$

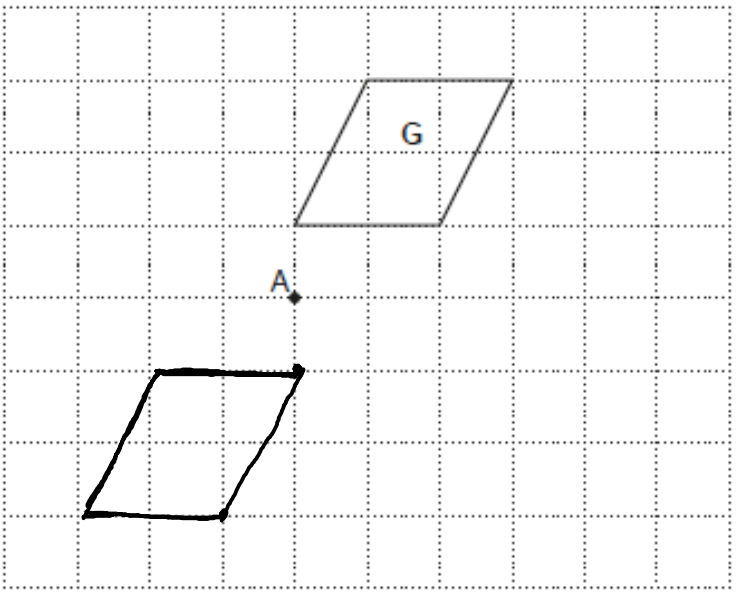
Horse $= 72^\circ = \frac{72}{12} = 6$

Dog $= 360^\circ - (72 + 24 + 36 + 144) = 84^\circ \rightarrow \frac{84}{12} = 7$



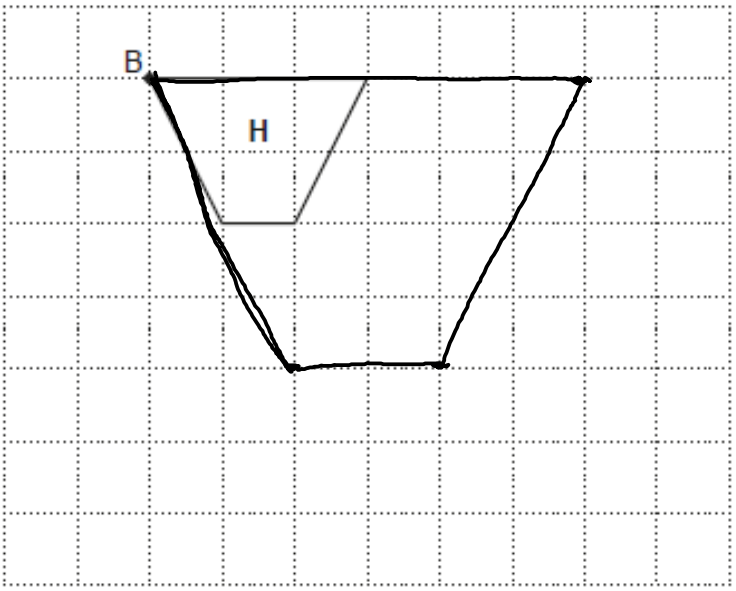
[3]

3 **(a)** Shape **G** is drawn on the grid.



Rotate shape **G** by 180° about the point A. **[2]**

(b) Shape **H** is drawn on the grid.



Enlarge shape **H** with scale factor 2 and the centre of enlargement at point B. **[2]**

4 Tom buys a radio for £40.
Later he sells it and makes a profit of 20%.

Tom says

The ratio of the price I paid for the radio to the price I sold the radio is 5 : 6.

Show that Tom is correct. $40 \times 1.2 = 48$ sell price [3]

$40 : 48 \xrightarrow{\div 8} 5 : 6$

5 Multiply out.

(a) $3(x-2)$

$3x - 6$

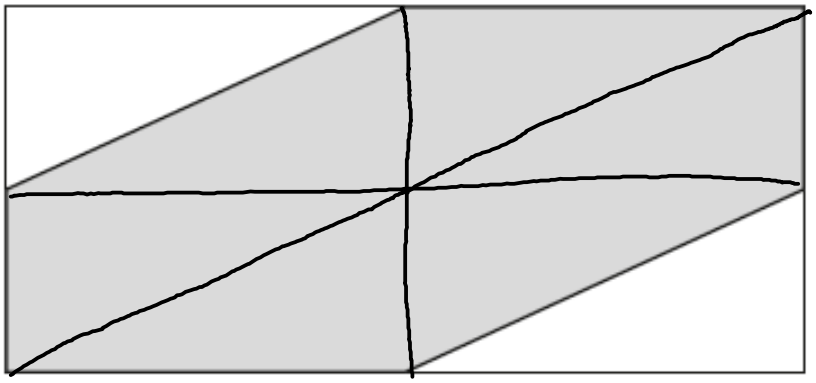
(a) $3x - 6$ [1]

(b) $2a(a+b)$

$2a^2 + 2ab$

(b) $2a^2 + 2ab$ [2]

6 The midpoints of the sides of a rectangle are joined by straight lines as shown.



Work out the percentage of the rectangle that is shaded.

Add your own lines like I have done above to make it easier. 2 lines from midpoint to midpoint.

And then split into triangles.

8 equal triangles and 6 are shaded → $\frac{6}{8} \times 100 = 75\%$

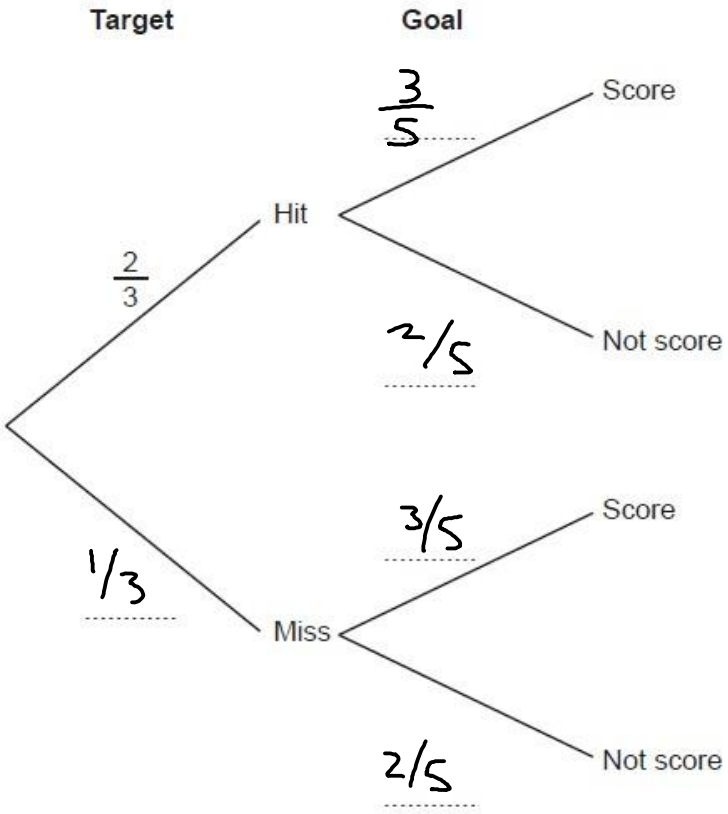
75 % **[4]**

7 Ryan shoots an arrow at a target. He then kicks a ball at a goal.

The probability that Ryan hits the target is $\frac{2}{3}$.

The probability that Ryan scores a goal is $\frac{3}{5}$.

(a) Complete the tree diagram.



[2]

(b) Find the probability that Ryan

(i) misses the target and does not score a goal,

$1/3 \times 2/5 = 2/15$

(b)(i) $2/15$ ..... [2]

(ii) either hits the target or scores a goal or both.

Hit, Not score: $2/3 \times 2/5$ + Miss, Score: $1/3 \times 3/5$ + Hit, Score: $2/3 \times 3/5$ =

$4/15 + 3/15 + 6/15 = 13/15$

(ii) $13/15$ ..... [2]

8 Solve the simultaneous equations.

$$2x - y = 7$$
$$2x + y = 5$$

$$\begin{array}{r} 2x - y = 7 \\ - \quad 2x + y = 5 \\ \hline 0 - 2y = 2 \end{array}$$

$$-2y = -2$$

$$y = -1$$

$$2x + y = 5$$

$$2x + (-1) = 5$$

$$2x = 6$$

$$x = 3$$

$x =$ 3

$y =$ −1 [3]

9 Two model cars, **A** and **B**, are in a race.
They start together on the starting line.
Assume each car travels at a constant speed.

Car **A** takes 30 seconds to complete each lap of the track.
Car **B** takes a whole number of seconds to complete each lap of the track.
The two cars next cross the starting line together 150 seconds after the start of the race.

Find the **four** possible times that car **B** could take to complete one lap.

You may find this information helpful.

$150 = 2 \times 3 \times 5 \times 5$
$30 = 2 \times 3 \times 5$

$2 \times 3 = 6$
$2 \times 5 = 10$
$3 \times 5 = 15$
$5 \times 5 = 25$

6 ..... 10 ..... 15 ..... 25 ..... seconds **[5]**

10 **(a)** Write down the multiplier for an increase of 140%.
Give your answer as a decimal.

(a) 1.40 **[1]**

(b) Ali invests £1500 in October.
The investment increases in value by 10% in November.
It then decreases in value by 20% in December.

Ali says

10% – 20% = -10%, so the £1500 has lost exactly 10% of its value.

(i) Explain what Ali has done wrong.

He is using the original value of £1500 to work out how much is lost. He needs to do it in steps using the new values at each stage. **[1]**

(ii) Work out the correct percentage loss.

November 10% increase → £1500 × 1.1 = £1650

December 20% decrease → £1650 × 0.8 = £1320

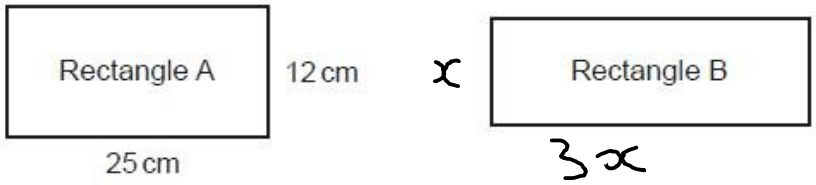
work out multiplier for overall loss.

£1500 × m = £1320 → $\frac{£1320}{£1500} = 0.88$

So percentage loss = 88%

88 % **[5]**

11 The diagram shows two rectangles, A and B.



Rectangle A has a width of 25 cm and a height of 12 cm.
The width of rectangle B is three times the height of rectangle B.

The area of rectangle A is equal to the area of rectangle B.

Find the perimeter of rectangle B.

Rectangle B width $= 3x$ Rectangle B height $= x$

Area A $= 12 \times 25 = 300\,cm^2$ Area B $= 3x \times x = 3x^2$

$300 = 3x^2 \rightarrow 100 = x^2 \rightarrow x = 10$

Perimeter B $\rightarrow 3x + 3x + x + x = 8x = 8(10) = 80$ cm^2

..... 80 ..... cm **[5]**

Total Marks for Question Set 3: 50