Day 356 **B Tier 10-a-day: Model Solutions**

1 Money

George buys 4 bottles of juice at £2.10 each and 2 pens at £1.45 each.
He pays with a £50 note.
Work out how much change he gets.

4 × £2.10 = £8.40
2 × £1.45 = £2.90
Total = £8.40 + £2.90 = £11.30
Change = £50 − £11.30 = £38.70
Answer: £38.70

2 Bar charts

The bar chart shows some information.
(a) Write down the mode.
(b) What fraction of the total is Bird? Give your answer in its simplest form.

(a) The tallest bar is Rabbit
(b) Total = 4 + 4 + 2 + 12 + 8 = 30
Bird = 8, so the fraction is 8 out of 30
Answer: (a) Rabbit (b) $\frac{4}{15}$

3 Scale drawings and maps

On a map, 1 cm represents 1 km.
Two towns are 12 cm apart on the map.
(a) Work out the real distance between the towns.
(b) Write the scale of the map in the form 1 : n.

(a) 12 × 1 = 12 km
(b) 1 km = 100 000 cm
So 1 cm on the map is 100 000 cm in real life
Answer: (a) 12 km (b) 1 : 100 000

4 Significant figures

Work out the value of this expression. (Calculator)

$$\frac{9.3}{8.1} + \frac{4.1}{7.6}$$

Give your answer correct to 2 significant figures.

Use a calculator: the full display is 1.687622...
Round to 2 significant figures: 1.7
Answer: 1.7

5 Real-life graphs

A printing company charges a set-up fee plus a cost for each box of leaflets.
The graph shows the total cost.
(a) Write down the fixed charge.
(b) Work out the cost for each box.

(a) The fixed charge is the cost when nothing has been used, where the line meets the vertical axis
(b) Take two points on the line, for example (0, 8) and (6, 26)
Cost for each box = (26 − 8) ÷ 6 = 3
Answer: (a) £8 (b) £3

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6 Congruent triangles

Triangle PQR has sides of 4 mm and 7 mm, and an angle of 60° that is not between them.
Triangle XYZ has sides of 4 mm and 7 mm, and an angle of 60° between them.
Are the two triangles congruent?
Give a reason for your answer.

In triangle PQR the angle is not between the two sides, in triangle XYZ it is
Two sides and a non-included angle do not prove congruence
Answer: No, the equal angle is in a different position

7 Frequency trees

There are 300 visitors.
$\frac{3}{5}$ of them are men and the rest are women.
$\frac{3}{5}$ of the men and $\frac{2}{5}$ of the women buy a drink.
One person is chosen at random. Work out the probability that they buy a drink.

men: $\frac{3}{5} \times 300 = 180$ and women: $300 - 180 = 120$

men who buy a drink: $\frac{3}{5} \times 180 = 108$

women who buy a drink: $\frac{2}{5} \times 120 = 48$

P = (108 + 48) out of 300

Answer: $\frac{13}{25}$

8 Forming and solving equations

A rectangle has length (3x + 5) cm and width (x + 3) cm.
The perimeter of the rectangle is 64 cm.
(a) Work out the value of x.
(b) Work out the area of the rectangle.

(a) 2(3x + 5) + 2(x + 3) = 64
8x + 16 = 64
8x = 48, so x = 6
(b) Length = 23 cm and width = 9 cm, so area = 23 × 9 = 207
Answer: (a) x = 6 (b) 207 cm^2

9 Percentage change

Chloe bought a laptop for £300 and sold it for £225.
Work out the percentage loss.

Loss = cost − selling price = £75

Percentage loss = $\frac{£75}{£300} \times 100 = 25\%$

Answer: 25% loss

10 Forming equations

I think of a number.
I divide it by 4 and then add 4.
The answer is 9.
Work out my number.

Let the number be n: $\frac{n}{4} + 4 = 9$

Subtract 4: $\frac{n}{4} = 5$

Multiply by 4
Answer: 20