Day 47 **B Tier 10-a-day: Model Solutions**

1 Scatter graphs

The scatter graph shows information about temperature and ice creams sold.
A line of best fit is drawn.
(a) Describe the correlation.
(b) Use the line of best fit to estimate the ice creams sold when temperature is 23.

(a) As one variable goes up, the other goes up
This is positive correlation
(b) Go up from 23 on the horizontal axis to the line, then across to the vertical axis
The reading is about 59
Answer: (a) Positive correlation (b) about 59

2 Equations with unknowns on both sides

Solve $8n - 8 = 5n - 23$

Subtract 5n from both sides: $3n - 8 = -23$
Add 8 to both sides: $3n = -15$
Divide both sides by 3
Answer: $n = -5$

3 Fuel use

A car travels 12 km on each litre of petrol. (Calculator)
Petrol costs £1.30 per litre.
Work out the cost of the petrol for a journey of 96 km.

Litres needed = 96 ÷ 12 = 8
Cost = 8 × £1.30 = £10.40
Answer: £10.40

4 Substitution with negative numbers

Work out the value of 4a + 3b
when a = −1 and b = 4

Substitute: 4 × (−1) + 3 × 4
−4 + 12 = 8
Answer: 8

5 Mean from a frequency table

The table shows the goals scored in each match by a team.
Work out the mean.

Multiply each value by its frequency and add: 1 × 7 + 2 × 4 + 3 × 1 + 4 × 3 = 30
Total frequency = 7 + 4 + 1 + 3 = 15
Mean = 30 ÷ 15 = 2
Answer: 2

6 Fractions and decimals

(a) Write $\frac{4}{25}$ as a decimal.

(b) Write $\frac{5}{6}$ as a recurring decimal.

For part (b), write down the first 8 decimal places and say which digits repeat.

(a) 4 ÷ 25 = 0.16
(b) 5 ÷ 6: use short division, adding zeros
5 ÷ 6 = 0.83333333...
The digit 3 repeats
Answer: (a) 0.16 (b) 0.83333333... (3 repeats)

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7 Midpoint and length of a line

A is the point (−1, 4) and B is the point (6, −3). (Calculator)
(a) Work out the coordinates of the midpoint of AB.
(b) Work out the length of AB. Give your answer correct to 1 decimal place.

(a) Midpoint = (5 ÷ 2, 1 ÷ 2) = (2.5, 0.5)
(b) Horizontal distance = 7, vertical distance = 7
$AB^2 = 7^2 + 7^2 = 49 + 49 = 98$
$AB = \sqrt{98} = 9.899...$
Answer: (a) (2.5, 0.5) (b) 9.9

8 Solving double inequalities

(a) Solve $0 < 2x + 4 < 4$
(b) Write down the integer values of x that satisfy this inequality.

(a) Subtract 4 in all three parts: $-4 < 2x < 0$
Divide all three parts by 2: $-2 < x < 0$
(b) The whole numbers in this range are −1
Answer: (a) $-2 < x < 0$ (b) −1

9 Proving a triangle is right-angled

A triangle has sides of length 9 mm, 8 mm and 6 mm.
Is the triangle right-angled?
You must show your working.

The longest side is 9. Check whether $a^2 + b^2 = c^2$
$6^2 + 8^2 = 36 + 64 = 100$
$9^2 = 81$
These are not equal, so the triangle is not right-angled
Answer: No, $6^2 + 8^2 = 100$ but $9^2 = 81$

10 Reverse repeated percentages

In a sale, the price of a sofa is reduced by 30%. (Calculator)
Two weeks later it is reduced by a further 50% of the new price.
The final price is £43.75.
Work out the original price of the sofa.

Multipliers: 0.7 and 0.5
Overall multiplier = 0.7 × 0.5 = 0.35
Original price = £43.75 ÷ 0.35 = £125
Answer: £125