Day 95 **B Tier 10-a-day: Model Solutions**

1 Scaling a recipe

Here are the amounts needed to make flapjacks for 8 people.
240 g of butter, 360 g of oats
Work out the amounts needed to make flapjacks for 5 people.

For 1 person: 240 ÷ 8 = 30 g and 360 ÷ 8 = 45 g
For 5 people: 30 × 5 = 150 and 45 × 5 = 225
Answer: 150 g of butter, 225 g of oats

2 Rounding

Write 2734.3871
(a) correct to 1 decimal place,
(b) correct to 2 significant figures.

(a) Look at the next digit after the first decimal place: 8
So 2734.3871 rounds to 2734.4
(b) The first significant figure is the first non-zero digit. Count 2 figures and look at the next digit.
2734.3871 rounds to 2700
Answer: (a) 2734.4 (b) 2700

3 Scale drawings and maps

On a map, 1 cm represents 4 km.
Two towns are 3 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) 3 × 4 = 12 km
(b) 4 km = 400 000 cm
So 1 cm on the map is 400 000 cm in real life
Answer: (a) 12 km (b) 1 : 400 000

4 Scatter graphs

The scatter graph shows information about speed and stopping distance.
A line of best fit is drawn.
(a) Describe the correlation.
(b) Use the line of best fit to estimate the stopping distance when speed is 60.

(a) As one variable goes up, the other goes up
This is positive correlation
(b) Go up from 60 on the horizontal axis to the line, then across to the vertical axis
The reading is about 50 m
Answer: (a) Positive correlation (b) about 50 m

5 Changing the subject

Make n the subject of the formula
$C = 5n - 1$

Add 1 to both sides: $C + 1 = 5n$
Divide both sides by 5
Answer: $\mathbf{n = \frac{C + 1}{5}}$

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6 Proving a triangle is right-angled

A triangle has sides of length 10 cm, 24 cm and 26 cm.
Is the triangle right-angled?
You must show your working.

The longest side is 26. Check whether $a^2 + b^2 = c^2$
$10^2 + 24^2 = 100 + 576 = 676$
$26^2 = 676$
These are equal, so the triangle is right-angled
Answer: Yes, $10^2 + 24^2 = 26^2$

7 Standard form calculations

Work out $(3.9 \times 10^6) + (4.5 \times 10^6)$
Give your answer in standard form.

The powers of 10 are the same, so add the numbers: 3.9 + 4.5 = 8.4
8.4×10^6
Answer: 8.4×10^6

8 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, 2) and (4, 14)
Cost for each box = (14 − 2) ÷ 4 = 3
Answer: (a) £2 (b) £3

9 Cumulative frequency

The cumulative frequency graph shows the times taken by 40 students to complete a puzzle.
(a) Use the graph to estimate the median.
(b) Work out an estimate for the interquartile range.

(a) Median is at 40 ÷ 2 = 20: read across from 20 on the vertical axis to the curve, then down: 42.5
(b) Lower quartile at 10: 31. Upper quartile at 30: 60
IQR = 60 − 31 = 29
Answer: (a) 42.5 minutes (b) 29 minutes

10 Trigonometry in isosceles triangles

Triangle PQR is isosceles with PQ = PR = 6 cm. (Calculator)
The base QR = 8 cm.
Work out the size of angle PQR.
Give your answer correct to 1 decimal place.

Split the triangle into two right-angled triangles. Half the base = 8 ÷ 2 = 4

$\cos Q = \frac{4}{6}$

Angle PQR = $\cos^{-1}(\frac{4}{6})$ = 48.190...

= 48.2° (1 d.p.)
Answer: 48.2°