Day 36 **B Tier 10-a-day: Model Solutions**

1 Mean

Here are the masses of some parcels.
11, 7, 5, 2, 7
Work out the mean.

Add the values: 11 + 7 + 5 + 2 + 7 = 32
Divide by the number of values: 32 ÷ 5 = 6.4
Answer: 6.4 kg

2 Symmetry

What is the order of rotational symmetry of a scalene triangle?

A scalene triangle only looks the same after a full turn, so the order is 1
Answer: 1

3 Fractions of amounts

A choir has 30 members.
$\frac{4}{5}$ of the members are girls.
How many are not girls?

$\frac{4}{5}$ of 30 = 30 ÷ 5 × 4 = 24
Not girls: 30 − 24 = 6
Answer: 6

4 Perimeter and area of compound shapes

The diagram shows the shape of a garden.
All the corners are right angles. All lengths are in cm.
(a) Calculate the perimeter.
(b) Calculate the area.

(a) Missing lengths: 15 − 8 = 7 and 12 − 7 = 5
Perimeter = 15 + 7 + 7 + 5 + 8 + 12 = 54
(b) Split into two rectangles: 15 × 7 = 105 and 8 × 5 = 40
105 + 40 = 145
Answer: (a) 54 cm (b) 145 cm^2

5 Real-life graphs

A plumber charges a call-out fee plus a cost for each hour of work.
The graph shows the total cost.
(a) Write down the fixed charge.
(b) Work out the cost for each hour.

(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, 6) and (6, 30)
Cost for each hour = (30 − 6) ÷ 6 = 4
Answer: (a) £6 (b) £4

6 Standard form calculations

A spacecraft travels at 6×10^4 km per hour.
It travels for 2.4×10^3 hours at this speed.
Work out how far it travels.
Give your answer in standard form.

Distance = speed × time
$(6 \times 10^4) \times (2.4 \times 10^3) = 14.4 \times 10^7$
In standard form: 1.44×10^8
Answer: 1.44×10^8 km

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7 Algebraic fractions

Simplify fully $\frac{20x^2}{5x}$

$20 \div 5 = 4$ and $x^2 \div x = x$

Answer: 4x

8 Scatter graphs

The scatter graph shows information about hours revising and test mark.
A line of best fit is drawn.
(a) Describe the correlation.
(b) Use the line of best fit to estimate the test mark when hours revising is 4.

(a) As one variable goes up, the other goes up
This is positive correlation
(b) Go up from 4 on the horizontal axis to the line, then across to the vertical axis
The reading is about 58
Answer: (a) Positive correlation (b) about 58

9 Substitution into formulae

Here is a formula.

$A = 3a^2$

Work out the value of A when a = 4

$A = 3 \times 4^2 = 3 \times 16$
$A = 48$
Answer: A = 48

10 Reverse repeated percentages

In a sale, the price of a sofa is reduced by 10%. (Calculator)
Two weeks later it is reduced by a further 20% of the new price.
The final price is £144.
Work out the original price of the sofa.

Multipliers: 0.9 and 0.8
Overall multiplier = $0.9 \times 0.8 = 0.72$
Original price = £144 ÷ 0.72 = £200
Answer: £200