Day 107 **B Tier 10-a-day: Model Solutions**

1 Enlargement

A rectangle is 2 m long and 10 m wide.
It is enlarged by scale factor ½.
(a) Write down the length and width of the enlarged rectangle.
(b) Work out the perimeter of the enlarged rectangle.

(a) 2 × 0.5 = 1 and 10 × 0.5 = 5
(b) Perimeter = 2 × (1 + 5) = 12
Answer: (a) 1 m by 5 m (b) 12 m

2 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 15.

(a) As one variable goes up, the other goes up
This is positive correlation
(b) Go up from 15 on the horizontal axis to the line, then across to the vertical axis
The reading is about 35
Answer: (a) Positive correlation (b) about 35

3 Compound areas

A rectangular pond is 8 m by 12 m.
There is a path of width 1 m all the way round the outside of the pond.
Work out the area of the path.

Outer rectangle: (8 + 2) × (12 + 2) = 10 × 14 = 140
Pond: 8 × 12 = 96
140 − 96 = 44
Answer: 44 m^2

4 Factorising

Factorise $x^2 - 2x$

Both terms have x as a factor
$x^2 \div x = x$ and $-2x \div x = -2$
Answer: $x(x - 2)$

5 Bar charts

The bar chart shows some information.
(a) Which bar is the shortest?
(b) What percentage of the total is Pear?

(a) The shortest bar is Banana
(b) Total = 32
8 ÷ 32 × 100 = 25%
Answer: (a) Banana (b) 25%

6 Solving quadratic equations

Solve $x^2 + 6x + 5 = 0$

Factorise: (x + 1)(x + 5) = 0
Either x + 1 = 0 or x + 5 = 0
Answer: $x = -5$ or $x = -1$

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7 Radius from area or circumference

The circumference of a circle is 71 cm. (Calculator)
Work out the diameter of the circle.
Give your answer correct to 1 decimal place.

Circumference = π × diameter
Diameter = 71 ÷ π = 22.600...
= 22.6 cm (1 d.p.)
Answer: 22.6 cm

8 Comparing fractions and percentages

Tom has $\frac{1}{5}$ of £40.

Sophie has 40% of £200.
Who has more money? You must show your working.

Tom: 40 ÷ 10 × 2 = £8
Sophie: 200 ÷ 100 × 40 = £80
£80 is more than £8, so Sophie has more
Answer: Sophie

9 Algebraic proof

Show that the sum of 3 consecutive whole numbers is always a multiple of 3.

Let the middle number be n. The numbers are n − 1, n, n + 1
Add them: the extra parts cancel, giving 3n
3n is a multiple of 3 because n is a whole number
Answer: 3n is a multiple of 3

10 Growth in standard form

There are 7.8×10^4 fish in a lake.
The number triples every day.
How many are there after 6 days?
Give your answer in standard form.

Each day multiply by 3, so multiply by $3^6 = 729$
$7.8 \times 10^4 \times 729 = 5686.2 \times 10^4$
In standard form: 5.6862×10^7
Answer: 5.6862×10^7