Day 116 **B Tier 10-a-day: Model Solutions**

1 Scaling a recipe

Here are the amounts needed to make a fruit crumble for 4 people.
160 g of flour, 100 g of butter
Work out the amounts needed to make a fruit crumble for 3 people.

For 1 person: 160 ÷ 4 = 40 g and 100 ÷ 4 = 25 g
For 3 people: 40 × 3 = 120 and 25 × 3 = 75
Answer: 120 g of flour, 75 g of butter

2 Points on a line

Does the point (7, −11) lie on the line
$y = -2x + 4$?
You must show your working.

Put x = 7 into the equation: $y = -2 \times 7 + 4 = -10$
The y-coordinate of the point is −11, which is not −10
Answer: No, when x = 7 the line has y = −10

3 Similar shapes

The two triangles are similar.
(a) Write down the scale factor of the enlargement from the smaller triangle to the larger triangle.
(b) Work out the value of x.
The diagram is not drawn accurately.

(a) Scale factor = 12 ÷ 6 = 2
(b) x = 5 × 2 = 10
Answer: (a) 2 (b) x = 10 m

4 Laws of indices

Simplify fully
(a) $2x^4 \times 6x^2$
(b) $18p^5 \div 3p^2$

(a) Multiply the numbers: 2 × 6 = 12. Add the powers: 4 + 2 = 6
(b) Divide the numbers: 18 ÷ 3 = 6. Subtract the powers: 5 − 2 = 3
Answer: (a) $12x^6$ (b) $6p^3$

5 Mixed numbers

Work out $3\frac{1}{6} - 1\frac{5}{6}$
Give your answer as a mixed number.

Write as improper fractions: $\frac{19}{6} - \frac{11}{6}$

Common denominator 6: $\frac{19}{6} - \frac{11}{6} = \frac{8}{6}$

As a mixed number: $1\frac{1}{3}$

Answer: $1\frac{1}{3}$

6 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 25.

(a) As one variable goes up, the other goes up
This is positive correlation
(b) Go up from 25 on the horizontal axis to the line, then across to the vertical axis
The reading is about 65
Answer: (a) Positive correlation (b) about 65

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7 Percentage as a fraction of

(a) Jasmine scores 30 out of 50 in a quiz. Write this as a percentage.
(b) Write £1 as a percentage of £10.

(a) $\frac{30}{50} \times 100 = 60\%$

(b) Change both to pence: 100p and 1000p

$\frac{100}{1000} \times 100 = 10\%$

Answer: (a) 60% (b) 10%

8 Area of a triangle using sine

In triangle ABC, AB = 18 m, BC = 5 m and angle ABC = 55°. (Calculator)
Work out the area of the triangle.
Give your answer correct to 1 decimal place.

Area = ½ab sin C
Area = ½ × 18 × 5 × sin 55°
= 36.862...
= 36.9 m^2 (1 d.p.)

Answer: 36.9 m^2

9 Tree diagrams

A bag contains 4 mint sweets and 2 toffee sweets.
Tara takes one at random and does not replace it, then takes a second.
Work out the probability that both are mint.

P(first mint) = $\frac{2}{3}$

P(second mint) = $\frac{3}{5}$

P(both mint) = $\frac{2}{3} \times \frac{3}{5} = \frac{2}{5}$

Answer: $\frac{2}{5}$

10 Simultaneous equations problem

A theme park sells adult tickets and child tickets.
2 adult tickets and 3 child tickets cost £45.
3 adult tickets and 3 child tickets cost £60.
Work out the cost of one adult ticket and the cost of one child ticket.

Let a = cost of one adult ticket and b = cost of one child ticket
2a + 3b = 45 and 3a + 3b = 60
Subtract: 1a = 60 − 45 = 15, so a = 15
Substitute: 2 × 15 + 3b = 45, so 3b = 15 and b = 5

Answer: One adult ticket costs £15 and one child ticket costs £5