Day 64 **B Tier 10-a-day: Model Solutions**

1 Angles on a line and round a point

The diagram shows 2 angles on a straight line.
Work out the value of n.
The diagram is not drawn accurately.

Angles on a straight line add up to 180°
3n + (2n + 20) = 180
5n + 20 = 180
5n = 160
n = 160 ÷ 5 = 32
Answer: n = 32°

2 Solving equations

Solve 5a + 11 = 36

Subtract 11 from both sides: 5a = 25
Divide both sides by 5
Answer: a = 5

3 Independent events

The probability that Amy is late for school on any day is 0.6.
The probability that Ben is late on any day is 0.2.
Whether each is late is independent of the other.
Work out the probability that at least one of them is late on Monday.

P(neither late) = (1 − 0.6) × (1 − 0.2) = 0.4 × 0.8 = 0.32
P(at least one late) = 1 − 0.32 = 0.68
Answer: 0.68

4 Laws of indices

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

(a) $4^2 = 16$ and the powers multiply: $2 \times 2 = 4$
(b) Multiply the numbers: $5 \times 6 = 30$. Add the powers: $2 + 3 = 5$
Answer: (a) $16y^4$ (b) $30p^5$

5 Ordering fractions

Write these in order of size.
Start with the smallest.
$\frac{4}{5}, \frac{29}{40}, \frac{2}{5}, \frac{3}{8}$

Write each as a decimal:
$\frac{4}{5} = 0.8$, $\frac{29}{40} = 0.725$, $\frac{2}{5} = 0.4$, $\frac{3}{8} = 0.375$
Order: $\frac{3}{8}, \frac{2}{5}, \frac{29}{40}, \frac{4}{5}$
Answer: $\frac{3}{8}, \frac{2}{5}, \frac{29}{40}, \frac{4}{5}$

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6 Proving a triangle is right-angled

A triangle has sides of length 6 mm, 8 mm and 9 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 $9^2 = 81$

7 Fraction problems

A fuel tank is $\frac{1}{4}$ full.

75 litres of fuel are added.

The fuel tank is now $\frac{1}{2}$ full.

Work out the capacity of the fuel tank.

Fraction added = $\frac{1}{2} - \frac{1}{4} = \frac{1}{4}$

$\frac{1}{4}$ of the capacity = 75 litres
Whole capacity = 75 × 4 = 300 litres
Answer: 300 litres

8 Solving quadratic equations

Solve $x^2 - 121 = 0$

Factorise as a difference of two squares: $(x - 11)(x + 11) = 0$
Either $x - 11 = 0$ or $x + 11 = 0$
Answer: $x = -11$ or $x = 11$

9 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 44.

(a) As one variable goes up, the other goes up
This is positive correlation
(b) Go up from 44 on the horizontal axis to the line, then across to the vertical axis
The reading is about 38 m
Answer: (a) Positive correlation (b) about 38 m

10 Combining ratios

In a bag of counters, the ratio of black to green is 4 : 3.
The ratio of green to white is 6 : 1.
Write down the ratio black : green : white.

Make the green part the same in both ratios: lowest common multiple of 3 and 6 is 6
black : green = 8 : 6
green : white = 6 : 1
black : green : white = 8 : 6 : 1
Answer: 8 : 6 : 1