Day 162 **B Tier 10-a-day: Model Solutions**

1 Repeated percentage change

The price of a laptop is £250.
The price is first increased by 40%, then the new price is increased by 20%.
(a) Work out the final price.
(b) Work out the overall percentage increase in the price.

(a) Multipliers: 1.4 and 1.2
250 × 1.4 × 1.2 = £420
(b) Overall multiplier = 1.68
Overall increase = 68%
Answer: (a) £420 (b) 68% increase

2 Ratio, one part known

The ratio of adults to children among the people on a bus is 1 : 2.
There are 4 adults.
How many children are there?

1 parts = 4 adults
1 part = 4 ÷ 1 = 4
children: 2 × 4 = 8
Answer: 8

3 Points on a line

Does the point (5, 6) lie on the line
$y = 2x - 5$?
You must show your working.

Put x = 5 into the equation: $y = 2 \times 5 - 5 = 5$
The y-coordinate of the point is 6, which is not 5
Answer: No, when x = 5 the line has y = 5

4 Relative frequency

A spinner has coloured sections. It is spun 150 times and lands on blue 120 times.
What is the relative frequency of blue?
Give your answer as a decimal.

120 ÷ 150 = 0.8
Answer: 0.8

5 Pythagoras in context

A kite is flown on a string 28 m long. (Calculator)
The kite is directly above a point 25 m from the person flying it, on level ground.
Work out the height of the kite above the ground, ignoring the height of the person. Give your answer correct to 1 decimal place.

The string is the hypotenuse of a right-angled triangle
$h^2 = 28^2 - 25^2 = 784 - 625 = 159$
$h = \sqrt{159} = 12.610...$
Answer: 12.6 m

6 HCF and LCM from prime factors

$A = 2^3 \times 3^3 \times 7$
$B = 2 \times 5 \times 7^2$
Write down, as a product of prime factors,
(a) the HCF of A and B
(b) the LCM of A and B

(a) HCF: take the smaller power of each prime that is in both: 2×7
(b) LCM: take the larger power of every prime: $2^3 \times 3^3 \times 5 \times 7^2$
Answer: (a) 2×7 (b) $2^3 \times 3^3 \times 5 \times 7^2$

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7 Changing the subject

Make u the subject of the formula

v = u + at

Subtract at from both sides

Answer: u = v − at

8 Multiplying and dividing fractions

Work out

(a) $\frac{7}{9} \times \frac{1}{4}$

(b) $\frac{1}{3} \div \frac{2}{3}$

Give each answer in its simplest form.

(a) Multiply the tops and the bottoms: $\frac{7}{36}$

(b) Turn the second fraction upside down and multiply: $\frac{1}{3} \times \frac{3}{2} = \frac{3}{6} = \frac{1}{2}$

Answer: (a) $\frac{7}{36}$ (b) $\frac{1}{2}$

9 Two-way tables

The table shows some information about 70 people at a meeting.

A person is chosen at random.

Find the probability that the person chose "Coffee".

Male who chose Coffee = 49 − 24 = 25

Female who chose Coffee = 7

Total who chose Coffee = 25 + 7 = 32

P = 32 out of 70

Answer: $\frac{16}{35}$

10 Scale drawings and maps

A road is 1.25 km long.

It is drawn on a map with scale 1 : 25 000.

Work out the length of the road on the map, in cm.

1.25 km = 125 000 cm

125 000 ÷ 25 000 = 5 cm

Answer: 5 cm