Day 321 **B Tier 10-a-day: Model Solutions**

1 Fractions in simplest form

What fraction of £1.50 is 60p?
Give your answer in its simplest form.

£1.50 = 150 pence

$\frac{60}{150} = \frac{2}{5}$

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

2 Reflection

The diagram shows triangle ABC on a grid.
(a) Write down the coordinates of the image of B after a reflection in the line x = 2.
(b) Write down the coordinates of the image of C after a reflection in the x-axis.

(a) B is at (1, 4). Reflect in the line x = 2: (3, 4)
(b) C is at (1, 2). Reflect in the x-axis: (1, −2)
Answer: (a) (3, 4) (b) (1, −2)

3 Forming equations

I think of a number.
I add 14 and then multiply the result by 6.
The answer is 120.
Work out my number.

Let the number be n: 6(n + 14) = 120
Divide by 6: n + 14 = 20
Subtract 14
Answer: 6

4 Two-way tables

The table shows some information about 66 students.
A person is chosen at random.
Find the probability that the person is in the group "Girls" and chose "Walk".

Girls who chose Walk = 66 − 32 − 24 = 10
P = 10 out of 66

Answer: $\frac{5}{33}$

5 The nth term

Here are the first four terms of a sequence.
7, 11, 15, 19
Find an expression, in terms of n, for the nth term of this sequence.

The terms go up by 4 each time, so the nth term starts with 4n
When n = 1: 4 and the first term is 7, so we need to add 3
nth term = 4n + 3
Answer: 4n + 3

6 Capture-recapture

100 frogs in a lake are caught, tagged and returned to the lake.
Later, a sample of 60 frogs is caught and 12 of them are tagged.
Estimate the total number of frogs in the lake.

Proportion tagged in the sample = 12 ÷ 60
This is the same proportion as 100 out of the whole population
Population ≈ 100 × 60 ÷ 12 = 500
Answer: 500

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7 Changing the subject

Make n the subject of the formula
C = 7(n + 11)

Divide both sides by 7: $\frac{C}{7} = n + 11$

Subtract 11 from both sides

Answer: $n = \frac{C}{7} - 11$

8 Venn diagrams

The Venn diagram shows information about 42 pupils in Year 9.
One of them is chosen at random.
Find the probability that the person chose French.

French circle = 13 + 8 = 21
Total = 42
P = 21 out of 42

Answer: $\frac{1}{2}$

9 Standard form calculations

A spacecraft travels at 2×10^6 km per hour.
It travels for 4.4×10^4 hours at this speed.
Work out how far it travels.
Give your answer in standard form.

Distance = speed × time
$(2 \times 10^6) \times (4.4 \times 10^4) = 8.8 \times 10^{10}$
Answer: 8.8×10^{10} km

10 Angles on a line and round a point

The diagram shows 3 angles round a point.
Work out the value of y.
The diagram is not drawn accurately.

Angles round a point add up to 360°
(2y + 120) + (2y + 20) + (4y + 60) = 360
8y + 200 = 360
8y = 160
y = 160 ÷ 8 = 20
Answer: y = 20°