Day 119 **B Tier 10-a-day: Model Solutions**

1 Simple probability

A bag contains 2 black pens, 8 blue pens and 7 red pens.
One is taken at random. Find the probability that it is not red.

Total = 2 + 8 + 7 = 17
Not red: 17 − 7 = 10
Simplify the fraction

Answer: $\frac{10}{17}$

2 Enlargement

A rectangle is 6 cm long and 4 cm wide.
It is enlarged by scale factor 1.5.
(a) Write down the length and width of the enlarged rectangle.
(b) Work out the perimeter of the enlarged rectangle.

(a) 6 × 1.5 = 9 and 4 × 1.5 = 6
(b) Perimeter = 2 × (9 + 6) = 30
Answer: (a) 9 cm by 6 cm (b) 30 cm

3 Adding fractions

Work out
(a) $\frac{1}{8} + \frac{4}{5}$
(b) $\frac{3}{8} - \frac{1}{9}$
Give each answer in its simplest form.

(a) Common denominator 40: $\frac{5}{40} + \frac{32}{40} = \frac{37}{40}$
(b) Common denominator 72: $\frac{27}{72} - \frac{8}{72} = \frac{19}{72}$

Answer: (a) $\frac{37}{40}$ **(b)** $\frac{19}{72}$

4 Simultaneous equations problem

A theme park sells adult tickets and child tickets.
3 adult tickets and 2 child tickets cost £50.
4 adult tickets and 2 child tickets cost £64.
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
3a + 2b = 50 and 4a + 2b = 64
Subtract: 1a = 64 − 50 = 14, so a = 14
Substitute: 3 × 14 + 2b = 50, so 2b = 8 and b = 4
Answer: One adult ticket costs £14 and one child ticket costs £4

5 Ordering standard form

Write these numbers in order of size.
Start with the smallest.
5.9×10^2, 0.00049, 5.4×10^5, 81,000

Write each in standard form: 5.9×10^2, 4.9×10^{-4}, 5.4×10^5, 8.1×10^4
Compare the powers of 10 first (the bigger the power, the bigger the number)
Order: 0.00049, 5.9×10^2, 81,000, 5.4×10^5
Answer: 0.00049, 5.9×10^2, 81,000, 5.4×10^5

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6 Expected outcomes

The probability that a biased dice lands on a six is 40%.
Work out how many times you would expect this to happen in 100 rolls of the dice.

Expected number = probability × number of trials
40% of 100 = 40
Answer: 40

7 Equations with fractional answers

Solve $8x - 8 = -3$
Give your answer as a fraction in its simplest form.

Add 8 to both sides: $8x = 5$

Divide both sides by 8: $x = \frac{5}{8}$

Answer: $x = \frac{5}{8}$

8 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 a.
The diagram is not drawn accurately.

(a) Scale factor = 36 ÷ 9 = 4
(b) a = 6 × 4 = 24
Answer: (a) 4 (b) a = 24 m

9 Tree diagrams

A bag contains 7 green beads and 2 yellow beads.
Holly takes one at random and does not replace it, then takes a second.
Work out the probability that the two are different colours.

P(green then yellow) = $\frac{7}{36}$

P(yellow then green) = $\frac{7}{36}$

Add: $\frac{7}{36} + \frac{7}{36} = \frac{7}{18}$

Answer: $\frac{7}{18}$

10 Growth in standard form

There are 9.8×10^3 fish in a lake.
The number doubles every day.
How many are there after 5 days?
Give your answer in standard form.

Each day multiply by 2, so multiply by $2^5 = 32$
$9.8 \times 10^3 \times 32 = 313.6 \times 10^3$
In standard form: 3.136×10^5
Answer: 3.136×10^5