Day 49 **B Tier 10-a-day: Model Solutions**

1 Ordering decimals

Write these numbers in order of size.
Start with the smallest number.
0.6, 0.65, 0.692, 0.58

Write each number to 3 decimal places:
0.600, 0.650, 0.692, 0.580
Now put them in order: 0.580, 0.600, 0.650, 0.692
Answer: 0.58, 0.6, 0.65, 0.692

2 Angles in quadrilaterals

ABCD is a rhombus.
Angle DAB = 56°.
(a) Write down the size of angle BCD.
(b) Work out the size of angle ABC.

(a) Opposite angles are equal, so angle BCD = 56°
(b) Angles next to each other add up to 180°
180 − 56 = 124
Answer: (a) 56° (b) 124°

3 Expected outcomes

The probability that a biased dice lands on a six is $\frac{1}{5}$.

Work out how many times you would expect this to happen in 50 rolls of the dice.

Expected number = probability × number of trials
$\frac{1}{5} \times 50 = 10$
Answer: 10

4 Disproving statements

Sam says, "When you square a number you always get a bigger number."
Give an example to show that Sam is wrong.

Try small numbers, including 1 and numbers between 0 and 1
$1^2 = 1$, which is not bigger than 1
Answer: $1^2 = 1$ (or $0.5^2 = 0.25$)

5 Two-way tables

The table shows some information about 85 members of a leisure centre.
A person is chosen at random.
Find the probability that the person is in the group "Children" and chose "Swim".

Children who chose Swim = 85 − 37 − 21 = 27
P = 27 out of 85
Answer: $\frac{27}{85}$

6 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 b.
The diagram is not drawn accurately.

(a) Scale factor = 18 ÷ 6 = 3
(b) b is on the smaller triangle, so divide: 21 ÷ 3 = 7
Answer: (a) 3 (b) b = 7 cm

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7 Expanding squared brackets

Expand and simplify $(3x - 4)^2$

Write as a product of two brackets: $(3x - 4)(3x - 4)$

$9x^2 - 12x - 12x + 16$

$9x^2 - 24x + 16$

Answer: $9x^2 - 24x + 16$

8 Using a given calculation

Use the fact that $28 \times 29 = 812$
to work out
(a) 280×290
(b) $81.2 \div 280$

(a) $280 = 28 \times 10$ and $290 = 29 \times 10$
So the answer is $812 \times 100 = 81{,}200$
(b) $81.2 = 812 \div 10$ and $280 = 28 \times 10$
$812 \div 28 = 29$, so the answer is $29 \div 100 = 0.29$
Answer: (a) 81,200 (b) 0.29

9 Simultaneous equations problem

A cafe sells cakes and drinks. All cakes cost the same and all drinks cost the same.
3 cakes and 1 drink cost £19.
2 cakes and 1 drink cost £14.
Work out the cost of one cake and the cost of one drink.

Let a = cost of one cake and b = cost of one drink
$3a + 1b = 19$ and $2a + 1b = 14$
Subtract: $1a = 19 - 14 = 5$, so $a = 5$
Substitute: $3 \times 5 + 1b = 19$, so $1b = 4$ and $b = 4$
Answer: One cake costs £5 and one drink costs £4

10 Tree diagrams

A bag contains 2 mint sweets and 6 toffee sweets.
Ravi takes one at random and does not replace it, then takes a second.
Work out the probability that both are mint.

P(first mint) = $\frac{1}{4}$

P(second mint) = $\frac{1}{7}$

P(both mint) = $\frac{1}{4} \times \frac{1}{7} = \frac{1}{28}$

Answer: $\frac{1}{28}$