Day 35 **B Tier 10-a-day: Model Solutions**

1 Perimeter with algebra

An equilateral triangle has sides of length (4x + 8) cm.
The perimeter of the triangle is 120 cm.
Work out the value of x.

3(4x + 8) = 120
4x + 8 = 40
4x = 32
x = 8
Answer: x = 8

2 Probability of not happening

The probability that a drawing pin lands point up is $\frac{1}{4}$.

Work out the probability that a drawing pin does not land point up.

Probabilities add up to 1
$1 - \frac{1}{4} = \frac{3}{4}$
Answer: $\frac{3}{4}$

3 Compound areas

Two rectangles are joined to make a shape.
The first is 11 cm by 10 cm.
The second is 13 cm by 5 cm.
Work out the total area of the shape.

First rectangle: 11 × 10 = 110
Second rectangle: 13 × 5 = 65
110 + 65 = 175
Answer: 175 cm^2

4 Solving equations

Solve $9 - 4y = -3$

Add 4y to both sides: $9 = -3 + 4y$
Subtract −3 from both sides: 12 = 4y
Divide both sides by 4
Answer: y = 3

5 Exchange rates

The exchange rate is £1 = €1.18. (Calculator)
(a) Change £500 to euros.
(b) Change €118 to pounds (£).

(a) Multiply by 1.18: 500 × 1.18 = €590
(b) Divide by 1.18: 118 ÷ 1.18 = £100
Answer: (a) €590 (b) £100

6 Compound interest

Maya invests £500 in an account paying 2% compound interest per year. (Calculator)
Work out the value of her investment after 2 years.

Multiplier = 1 + 2 ÷ 100 = 1.02
Value = 500 × 1.02^2
= £520.20
Answer: £520.20

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7 Fractions and decimals

(a) Write $\frac{29}{50}$ as a decimal.

(b) Write $\frac{5}{11}$ as a recurring decimal.

For part (b), write down the first 8 decimal places and say which digits repeat.

(a) 29 ÷ 50 = 0.58
(b) 5 ÷ 11: use short division, adding zeros
5 ÷ 11 = 0.45454545...
The digits 45 repeat
Answer: (a) 0.58 (b) 0.45454545... (45 repeats)

8 Combining ratios

In a bag of counters, the ratio of white to black is 3 : 4.
The ratio of black to green is 2 : 3.
Write down the ratio white : black : green.

Make the black part the same in both ratios: lowest common multiple of 4 and 2 is 4
white : black = 3 : 4
black : green = 4 : 6
white : black : green = 3 : 4 : 6
Answer: 3 : 4 : 6

9 Equation of a line

Line L has equation $y = -x - 3$
Line M is parallel to line L and passes through the point $(-2, -1)$.
Find the equation of line M.

Parallel lines have the same gradient, so line M is $y = -1x + c$
Substitute $x = -2$ and $y = -1$: $-1 = -1 \times (-2) + c$
$c = -1 - 2 = -3$
Answer: $y = -x - 3$

10 Simple interest

Dev invests £2000 for 6 years.
The account pays 2.5% simple interest per year.
(a) Work out the interest earned each year.
(b) Work out the total amount in the account after 6 years.

(a) 2.5% of £2000 = 2000 ÷ 100 × 2.5 = £50
(b) Interest over 6 years: 6 × £50 = £300
Total = £2000 + £300 = £2300
Answer: (a) £50 (b) £2300