Day 109 **B Tier 10-a-day: Model Solutions**

1 Term-to-term rules

The first term of a sequence is 5.
The term-to-term rule is: double the term, then add 3.
Work out the 5th term.

2nd term: 2 × 5 + 3 = 13
3rd term: 2 × 13 + 3 = 29
4th term: 2 × 29 + 3 = 61
5th term: 2 × 61 + 3 = 125
Answer: 125

2 Unitary method

8 tickets cost £4.80.
(a) Work out the cost of 4 tickets.
(b) How many tickets can be bought for £4.80?

(a) 1 ticket costs £4.80 ÷ 8 = 60p
4 × 60p = £2.40
(b) £4.80 ÷ 60p = 8
Answer: (a) £2.40 (b) 8

3 Angles in quadrilaterals

PQRS is a kite with PQ = PS and RQ = RS.
Angle SPQ = 64° and angle QRS = 68°.
Work out the size of angle PQR.

Angles in a quadrilateral add up to 360°
Angles PQR and PSR are equal in a kite
360 − 64 − 68 = 228
228 ÷ 2 = 114
Answer: 114°

4 Forming equations

I think of a number.
I divide it by 3 and then add 4.
The answer is 8.
Work out my number.

Let the number be n: $\frac{n}{3} + 4 = 8$

Subtract 4: $\frac{n}{3} = 4$

Multiply by 3
Answer: 12

5 Simple interest

George invests £800 for 4 years.
The account pays 3.5% simple interest per year.
(a) Work out the interest earned each year.
(b) Work out the total amount in the account after 4 years.

(a) 3.5% of £800 = 800 ÷ 100 × 3.5 = £28
(b) Interest over 4 years: 4 × £28 = £112
Total = £800 + £112 = £912
Answer: (a) £28 (b) £912

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6 Sharing in a ratio

Zain, Chloe and Ben share 130 sweets in the ratio 1 : 6 : 3.
Work out how many Zain gets.

1 + 6 + 3 = 10 parts
1 part = 130 ÷ 10 = 13
Zain gets 1 × 13 = 13
Answer: 13

7 Perimeter with algebra

A rectangle has length (4x + 6) cm and width (x + 3) cm.
The perimeter of the rectangle is 138 cm.
(a) Work out the value of x.
(b) Work out the area of the rectangle.

(a) 2(4x + 6) + 2(x + 3) = 138
10x + 18 = 138
10x = 120
x = 12
(b) Length = 54, width = 15, area = 54 × 15 = 810
Answer: (a) x = 12 (b) 810 cm^2

8 Simultaneous equations problem

A cafe sells cakes and drinks. All cakes cost the same and all drinks cost the same.
2 cakes and 3 drinks cost £11.
1 cake and 3 drinks cost £7.
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
2a + 3b = 11 and 1a + 3b = 7
Subtract: 1a = 11 − 7 = 4, so a = 4
Substitute: 2 × 4 + 3b = 11, so 3b = 3 and b = 1
Answer: One cake costs £4 and one drink costs £1

9 Fraction problems

A fuel tank is $\frac{2}{5}$ full.

38 litres of fuel are added.

The fuel tank is now $\frac{1}{2}$ full.

Work out the capacity of the fuel tank.

Fraction added = $\frac{1}{2} - \frac{2}{5} = \frac{1}{10}$

$\frac{1}{10}$ of the capacity = 38 litres
Whole capacity = 38 × 10 = 380 litres
Answer: 380 litres

10 Exchange rates

The exchange rate is £1 = €1.15. (Calculator)
(a) Change £150 to euros.
(b) Change €138 to pounds (£).

(a) Multiply by 1.15: 150 × 1.15 = €172.5
(b) Divide by 1.15: 138 ÷ 1.15 = £120
Answer: (a) €172.5 (b) £120