Day 76 **B Tier 10-a-day: Model Solutions**

1 Percentages of amounts

Work out
(a) 80% of £240
(b) 20% of 60

(a) 10% of £240 = £24
80% = 8 × £24 = £192
(b) 10% of 60 = 6
20% = 2 × 6 = 12
Answer: (a) £192 (b) 12

2 Cost formulae

A hire company charges £16 plus £2 for each day a van is hired.
(a) Work out the total cost for 9 days.
(b) The total cost is £28. Work out the number of days.

(a) 2 × 9 = 18, then 16 + 18 = 34
(b) Take off the fixed charge: 28 − 16 = 12
Divide by the cost for each: 12 ÷ 2 = 6
Answer: (a) £34 (b) 6

3 Pie charts

In a survey, 2 people chose hockey.
There were 36 people in the survey altogether.
The results are shown in a pie chart. Work out the angle for hockey.

Fraction = 2 out of 36
Angle = 2 ÷ 36 × 360° = 20°
Answer: 20°

4 Perimeter and area of compound shapes

The diagram shows the shape of a car park.
All the corners are right angles. All lengths are in m.
(a) Calculate the perimeter.
(b) Calculate the area.

(a) Missing lengths: 8 − 3 = 5 and 13 − 7 = 6
Perimeter = 8 + 7 + 5 + 6 + 3 + 13 = 42
(b) Split into two rectangles: 8 × 7 = 56 and 3 × 6 = 18
56 + 18 = 74
Answer: (a) 42 m (b) 74 m^2

5 Mixed numbers

Work out $1\frac{3}{4} \times 1\frac{1}{6}$

Give your answer as a mixed number.

Write as improper fractions: $\frac{7}{4} \times \frac{7}{6}$

Multiply: $\frac{49}{24}$

As a mixed number: $2\frac{1}{24}$

Answer: $2\frac{1}{24}$

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6 Function notation

f(x) = 4x − 1
(a) Work out f(5)
(b) Solve f(x) = 27

(a) f(5) = 4 × 5 − 1 = 19
(b) 4x − 1 = 27
Add 1 to both sides: 4x = 28
Divide both sides by 4
Answer: (a) 19 (b) x = 7

7 Capture-recapture

60 frogs in a lake are caught, tagged and returned to the lake.
Later, a sample of 50 frogs is caught and 8 of them are tagged.
Estimate the total number of frogs in the lake.

Proportion tagged in the sample = 8 ÷ 50
This is the same proportion as 60 out of the whole population
Population ≈ 60 × 50 ÷ 8 = 375
Answer: 375

8 Surface area of cuboids

A cube has side length 9 cm.
Work out the total surface area of the cube.

A cube has 6 identical square faces
Area of one face = 9 × 9 = 81
6 × 81 = 486
Answer: 486 cm^2

9 Reverse percentages

Kofi's rent goes up by 15%. (Calculator)
The new rent is £92 a month.
Work out the rent before the increase.

The new rent is 100% + 15% = 115% of the old rent.
115% = £92, so 1% = £92 ÷ 115 = 80p
100% = 80p × 100 = £80
Answer: £80

10 Surface area of a cylinder

A drum has radius 10 cm and height 13 cm.
It is closed.
Work out the total outside surface area.
Give your answer in terms of π.

Two circles: 2 × π × 10^2 = 200π
Curved surface: 2 × π × 10 × 13 = 260π
Total = 200π + 260π = 460π
Answer: 460π cm^2