Day 249 **B Tier 10-a-day: Model Solutions**

1 Solving equations

Solve $3p = 9$

Divide both sides by 3

Answer: $p = 3$

2 Factors and multiples

Write down all the common factors of 8 and 18.

Factors of 8: 1, 2, 4, 8
Factors of 18: 1, 2, 3, 6, 9, 18
The common factors are the numbers in both lists

Answer: 1, 2

3 Radius from area or circumference

The area of a circle is 49π cm^2.
Work out the radius of the circle.

Area = πr^2, so $r^2 = 49$
$r = \sqrt{49} = 7$

Answer: 7 cm

4 Equations with fractions

Solve $\frac{5x + 13}{3} = 6$

Multiply both sides by 3: $5x + 13 = 18$
Subtract 13 from both sides: $5x = 5$
Divide both sides by 5

Answer: $x = 1$

5 Perimeter and area of compound shapes

The diagram shows the shape of a patio.
All the corners are right angles. All lengths are in cm.
(a) Work out the perimeter.
(b) Work out the area.

(a) Missing lengths: $9 - 4 = 5$ and $15 - 10 = 5$
Perimeter = $9 + 10 + 5 + 5 + 4 + 15 = 48$
(b) Split into two rectangles: $9 \times 10 = 90$ and $4 \times 5 = 20$
$90 + 20 = 110$

Answer: (a) 48 cm (b) 110 cm^2

6 Midpoint of a line segment

A is the point $(-3, -1)$ and B is the point $(9, -7)$.
Find the coordinates of the midpoint of AB.

Add the x-coordinates and halve: $(-3 + 9) \div 2 = 3$
Add the y-coordinates and halve: $(-1 - 7) \div 2 = -4$

Answer: $(3, -4)$

7 Capture-recapture

20 deer in a lake are caught, tagged and returned to the lake.
Later, a sample of 60 deer is caught and 12 of them are tagged.
Estimate the total number of deer in the lake.

Proportion tagged in the sample = $12 \div 60$
This is the same proportion as 20 out of the whole population
Population $\approx 20 \times 60 \div 12 = 100$

Answer: 100

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8 Fractions in simplest form

Ivan scores 16 out of 80 in a test.
Write his score as a fraction in its simplest form.

16 out of 80 is $\frac{16}{80}$

Divide top and bottom by 16: $\frac{1}{5}$

Answer: $\frac{1}{5}$

9 Reading pie charts

The pie chart shows the favourite choices of 360 people.
The angle for Curry is not shown.
Work out how many people chose Curry.

Angle for Curry = 360° − (70° + 50° + 160°) = 360° − 280° = 80°
80 ÷ 360 × 360 = 80
Answer: 80

10 Reverse repeated percentages

In a sale, the price of a sofa is reduced by 30%. (Calculator)
Two weeks later it is reduced by a further 10% of the new price.
The final price is £157.50.
Work out the original price of the sofa.

Multipliers: 0.7 and 0.9
Overall multiplier = 0.7 × 0.9 = 0.63
Original price = £157.50 ÷ 0.63 = £250
Answer: £250