Day 69 **B Tier 10-a-day: Model Solutions**

1 Substitution

Work out the value of 4t + 8 when t = 7

Replace t with 7: 4 × 7 + 8
28 + 8 = 36
Answer: 36

2 Pie charts

In a pie chart showing the answers of 72 people, the angle for car is 60°.
How many people chose car?

60° out of 360° = $\frac{1}{6}$

$\frac{1}{6}$ of 72 = 12
Answer: 12

3 Exterior angles of polygons

Each interior angle of a regular polygon is 150°.
Work out the number of sides of the polygon.

Exterior angle = 180° − 150° = 30°
Number of sides = 360 ÷ 30 = 12
Answer: 12 sides

4 Wages and overtime

Ravi is paid £8 per hour for a 40 hour week. (Calculator)
Overtime is paid at time and a half.
In one week he works 5 hours of overtime.
Work out his total pay for that week.

Normal pay: 40 × £8 = £320
Overtime rate: £8 × 1.5 = £12 per hour
Overtime pay: 5 × £12 = £60
Total: £320 + £60 = £380
Answer: £380

5 Midpoint and length of a line

A is the point (3, −5) and B is the point (−6, 1). (Calculator)
(a) Work out the coordinates of the midpoint of AB.
(b) Work out the length of AB. Give your answer correct to 1 decimal place.

(a) Midpoint = (−3 ÷ 2, −4 ÷ 2) = (−1.5, −2)
(b) Horizontal distance = 9, vertical distance = 6
$AB^2 = 9^2 + 6^2 = 81 + 36 = 117$
$AB = \sqrt{117} = 10.817...$
Answer: (a) (−1.5, −2) (b) 10.8

6 Best buys

Coffee is sold in two sizes.
Small: 200 g for 90p
Large: 300 g for £1.26
Which size is better value for money?
You must show your working.

Compare the cost of 600 g of each
Large: 2 × £1.26 = £2.52
Small: 3 × 90p = £2.70
The large is cheaper for the same amount
Answer: The large size

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7 Enlargement

A rectangle is 2 cm long and 8 cm wide.
It is enlarged by scale factor ½.
(a) Write down the length and width of the enlarged rectangle.
(b) Work out the perimeter of the enlarged rectangle.

(a) 2 × 0.5 = 1 and 8 × 0.5 = 4
(b) Perimeter = 2 × (1 + 4) = 10
Answer: (a) 1 cm by 4 cm (b) 10 cm

8 Ordering decimals

Write these numbers in order of size.
Start with the smallest number.
2.602, 2.66, 2.72, 2.6

Write each number to 3 decimal places:
2.602, 2.660, 2.720, 2.600
Now put them in order: 2.600, 2.602, 2.660, 2.720
Answer: 2.6, 2.602, 2.66, 2.72

9 Where a line crosses the axes

A straight line has equation $y = -5x - 30$
(a) Write down the coordinates of the point where the line crosses the y-axis.
(b) Work out the coordinates of the point where the line crosses the x-axis.

(a) When x = 0, y = −30
(b) The line crosses the x-axis when y = 0: $-5x - 30 = 0$
$-5x = 30$
$x = -6$
Answer: (a) (0, −30) (b) (−6, 0)

10 Cumulative frequency

The cumulative frequency graph shows the times taken by 40 students to complete a puzzle.
(a) Use the graph to estimate the median.
(b) Work out an estimate for the interquartile range.

(a) Median is at 40 ÷ 2 = 20: read across from 20 on the vertical axis to the curve, then down: 50
(b) Lower quartile at 10: 45. Upper quartile at 30: 65
IQR = 65 − 45 = 20
Answer: (a) 50 minutes (b) 20 minutes