Day 319 **B Tier 10-a-day: Model Solutions**

1 Probability of not happening

The probability that a train is on time is 65%.
Work out the probability that a train is not on time.

Probabilities add up to 100%
100% − 65% = 35%
Answer: 35%

2 Time

A concert starts at 3:40 pm.
It lasts 3 hours 27 minutes.
At what time does it finish? Give your answer using am or pm.

3:40 pm + 3 hours = 6:40 pm
6:40 pm + 27 minutes = 7:07 pm
Answer: 7:07 pm

3 Exterior angles of polygons

Each interior angle of a regular polygon is 165°.
Work out the number of sides of the polygon.

Exterior angle = 180° − 165° = 15°
Number of sides = 360 ÷ 15 = 24
Answer: 24 sides

4 Solving double inequalities

(a) Solve $10 \leq 4x + 2 \leq 18$
(b) Write down the integer values of x that satisfy this inequality.

(a) Subtract 2 in all three parts: $8 \leq 4x \leq 16$
Divide all three parts by 4: $2 \leq x \leq 4$
(b) The whole numbers in this range are 2, 3, 4
Answer: (a) $2 \leq x \leq 4$ (b) 2, 3, 4

5 Volume of a prism

The diagram shows a prism.
Its cross-section is an isosceles triangle.
Work out the volume of the prism.
The diagram is not drawn accurately.

Area of cross-section = ½ × 12 × 8 = 48
Volume of prism = area of cross-section × length
48 × 5 = 240
Answer: 240 cm^3

6 Significant figures

Work out the value of this expression. (Calculator)

$$\frac{7.2 + 7.9}{6 \times 4.3}$$

Give your answer correct to 4 significant figures.

Use a calculator: the full display is 0.585271...
Round to 4 significant figures: 0.5853
Answer: 0.5853

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7 Population density

City E has a population density of 25 people per km^2.
Its area is 12 km^2.
Work out its population.

Population = density × area
25 × 12 = 300
Answer: 300

8 Algebraic fractions

Simplify fully $\frac{16x - 16}{4}$

Factorise the top: 4(4x − 4)
Cancel the 4 on the top and bottom
Answer: 4x − 4

9 Bounds

The length of a rectangle is 31 cm and its width is 18 cm.
Both measurements are correct to the nearest cm.
Work out the lower bound for the area of the rectangle.

Lower bound of each side = value − 0.5: 30.5 cm and 17.5 cm
Area = 30.5 × 17.5 = 533.75 cm^2
Answer: 533.75 cm^2

10 Substitution with negative numbers

Work out the value of 4a + 6b
when a = −6 and b = 6

Substitute: 4 × (−6) + 6 × 6
−24 + 36 = 12
Answer: 12