Day 280 **B Tier 10-a-day: Model Solutions**

1 Interior angles of regular polygons

A regular polygon has 24 sides.
(a) Work out the size of one exterior angle.
(b) Work out the size of one interior angle.

(a) Exterior angles add up to 360°, so 360 ÷ 24 = 15°
(b) Interior angle = 180 − 15 = 165°
Answer: (a) 15° (b) 165°

2 Metric units

(a) Change 8.7 cm to mm.
(b) Change 1170 m to km.

(a) 1 cm = 10 mm, so multiply by 10: 8.7 × 10 = 87
(b) 1 km = 1000 m, so divide by 1000: 1170 ÷ 1000 = 1.17
Answer: (a) 87 mm (b) 1.17 km

3 Factorising

Factorise fully $20x^2 + 25x$

The highest common factor of 20 and 25 is 5, and both terms have x
So take out 5x. Divide each term by 5x: 4x + 5
Answer: 5x(4x + 5)

4 Enlargement

A rectangle is 12 m long and 8 m wide.
It is enlarged by scale factor 2.
(a) Write down the length and width of the enlarged rectangle.
(b) Work out the perimeter of the enlarged rectangle.

(a) 12 × 2 = 24 and 8 × 2 = 16
(b) Perimeter = 2 × (24 + 16) = 80
Answer: (a) 24 m by 16 m (b) 80 m

5 Stratified sampling

A stratified sample of 40 students is taken from the 400 students in the table.
Work out how many students should be sampled from Year 7.

Sample fraction = 40 ÷ 400
Year 7: 100 ÷ 400 × 40 = 10
Answer: 10

6 Forming and solving equations

The angles in a triangle are x°, (2x + 22)° and (3x − 10)°.
(a) Work out the value of x.
(b) Work out the size of the largest angle.

(a) The angles add up to 180°: x + (2x + 22) + (3x − 10) = 180
6x + 12 = 180
6x = 168, so x = 28
(b) The angles are 28°, 78° and 74°
Answer: (a) x = 28 (b) 78°

7 Significant figures

Work out the value of this expression. (Calculator)

$$\frac{6.4 + 4.4}{9.7 \times 9.8}$$

Give your answer correct to 3 significant figures.

Use a calculator: the full display is 0.113612...
Round to 3 significant figures: 0.114
Answer: 0.114

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8 Pythagoras in context

Priya walks 6 km north and then 8 km east.
Work out the straight line distance from the start to the finish.

The two walks are at right angles, so use Pythagoras

$d^2 = 6^2 + 8^2 = 36 + 64 = 100$

$d = \sqrt{100} = 10$

Answer: 10 km

9 Tree diagrams

A bag contains 6 green beads and 5 yellow beads.
Leo takes one at random and does not replace it, then takes a second.
Work out the probability that the two are different colours.

P(green then yellow) = $\frac{3}{11}$

P(yellow then green) = $\frac{3}{11}$

Add: $\frac{3}{11} + \frac{3}{11} = \frac{6}{11}$

Answer: $\mathbf{\frac{6}{11}}$

10 Solving quadratic equations

Solve $x^2 + 6x = 0$

Factorise: $x(x + 6) = 0$

Either $x = 0$ or $x + 6 = 0$

Answer: $x = -6$ or $x = 0$