Day 265 **B Tier 10-a-day: Model Solutions**

1 Faces, edges and vertices

Write down the number of faces, edges and vertices of a cylinder.
Count curved faces and curved edges as well.

Faces: 2 flat faces and 1 curved face = 3
Edges: 2 (the two circles)
Vertices: 0 (there are no corners)
Answer: faces: 3 edges: 2 vertices: 0

2 Types of number

Here is a list of numbers.
70, 46, 71, 78, 57, 24, 23, 25
From the list, write down
(a) a square number
(b) a multiple of 7

(a) 25 (5 × 5) is a whole number multiplied by itself
(b) 70 (7 × 10) is in the 7 times table
Answer: (a) 25 (b) 70

3 Angles in parallel lines

In the diagram, AB is parallel to CD.
(a) Work out the size of angle t.
(b) Give a reason for your answer.
The diagram is not drawn accurately.

Angle t and the 65° angle are co-interior angles (C shape)
t = 180 − 65 = 115°
Co-interior angles add up to 180°
Answer: (a) t = 115° (b) Co-interior angles add up to 180°

4 Comparing data sets

Here are Amy's and Ravi's daily sales.
Amy: 64, 43, 59, 55, 56
Ravi: 54, 51, 49, 50, 56
Compare their results using the mean and the range.

Amy: mean = 277 ÷ 5 = 55.4, range = 64 − 43 = 21
Ravi: mean = 260 ÷ 5 = 52, range = 56 − 49 = 7
Amy has the higher mean
Ravi has the smaller range, so is more consistent
Answer: Amy has the higher mean (55.4 v 52). Ravi is more consistent (range 7 v 21)

5 Inequalities on a number line

Write down the inequality shown on the number line. Use x for the variable.

The circle at −2 is filled in, so −2 is included
The line goes to the left, so x is less than −2
Answer: $x \leq -2$

6 Volume of a prism

This prism has a right-angled triangle as its cross-section.
Calculate the volume of the prism.
The diagram is not drawn accurately.

Area of cross-section = ½ × 4 × 8 = 16
Volume of prism = area of cross-section × length
16 × 12 = 192
Answer: 192 cm^3

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7 Ratio with a difference

Zain and Jack share some money in the ratio 3 : 1.
Zain gets £4 more than Jack.
Work out the total amount of money.

Difference in parts: 3 − 1 = 2
2 parts = £4, so 1 part = £2
Total parts = 3 + 1 = 4
Total = 4 × £2 = £8
Answer: £8

8 Trial and improvement

The equation $x^3 - 2x = 5$ has a solution between 2 and 3. (Calculator)
Use trial and improvement to find this solution.
Give your answer correct to 1 decimal place.

x = 2.5: $2.5^3 - 2 \times 2.5 = 10.625$ (too big)
x = 2.2: $2.2^3 - 2 \times 2.2 = 6.248$ (too big)
x = 2.1: $2.1^3 - 2 \times 2.1 = 5.061$ (too big)
x = 2.05: value = 4.515 (too small), so the solution is above 2.05
So x = 2.1 to 1 decimal place
Answer: x = 2.1

9 Average speed

A cyclist travels at 30 km/h for 3 hours and then at 60 km/h for 2 hours.
Work out its average speed for the whole journey.

Distance: 30 × 3 = 90 km and 60 × 2 = 120 km
Total distance = 210 km and total time = 5 hours
Average speed = 210 ÷ 5 = 42
Answer: 42 km/h

10 Fractions in simplest form

What fraction of £6 is 90p?
Give your answer in its simplest form.

£6 = 600 pence
$\frac{90}{600} = \frac{3}{20}$
Answer: $\frac{3}{20}$