Day 205 **B Tier 10-a-day: Model Solutions**

1 Unitary method

5 tickets cost £1.25.
Work out the cost of 4 tickets.

1 ticket costs £1.25 ÷ 5 = 25p
4 tickets cost 4 × 25p = £1
Answer: £1

2 Powers and roots

Write down
(a) the square root of 9
(b) the cube root of 125

(a) 3 × 3 = 9, so the square root is 3
(b) 5 × 5 × 5 = 125, so the cube root is 5
Answer: (a) 3 (b) 5

3 Loci

AB is a straight fence 16 m long.
A path is always exactly 4 m from the fence AB, on both sides, and also goes round each end.
Describe the shape of the path.

On each side, the path is a straight line parallel to AB, 4 m away
At each end the path is a semicircle of radius 4 m
Answer: Two parallel lines 16 m long, joined at each end by a semicircle of radius 4 m

4 Term-to-term rules

The first term of a sequence is 4.
The term-to-term rule is: double the term, then add 4.
Work out the 5th term.

2nd term: 2 × 4 + 4 = 12
3rd term: 2 × 12 + 4 = 28
4th term: 2 × 28 + 4 = 60
5th term: 2 × 60 + 4 = 124
Answer: 124

5 Multiplying and dividing fractions

Work out
(a) $\frac{1}{10} \times \frac{1}{8}$
(b) $\frac{2}{5} \div \frac{1}{3}$
Give each answer in its simplest form.

(a) Multiply the tops and the bottoms: $\frac{1}{80}$

(b) Turn the second fraction upside down and multiply: $\frac{2}{5} \times 3 = \frac{6}{5} = 1\frac{1}{5}$

Answer: (a) $\frac{1}{80}$ (b) $1\frac{1}{5}$

6 Fuel use

A car uses 40 litres of petrol to travel 640 km.
Work out how many kilometres it travels on each litre of petrol.

640 ÷ 40 = 16
Answer: 16 km per litre

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7 Volume of a prism

Here is a prism.
Its cross-section is an isosceles triangle.
Find the volume of this prism.
The diagram is not drawn accurately.

Area of cross-section = ½ × 12 × 7 = 42
Volume of prism = area of cross-section × length
42 × 5 = 210
Answer: 210 cm^3

8 Tree diagrams

A bag contains 3 red counters and 2 blue counters.
Ravi takes one at random and does not replace it, then takes a second.
Work out the probability that both are red.

P(first red) = $\frac{3}{5}$

P(second red) = $\frac{1}{2}$

P(both red) = $\frac{3}{5} \times \frac{1}{2} = \frac{3}{10}$

Answer: $\frac{3}{10}$

9 Integer inequalities

x is an integer.
Write down the greatest value of x for which x < 2.8

The integers below 2.8 are ... 1, 2
Answer: 2

10 Wages and overtime

Beth is paid £15.50 per hour for a 37 hour week. (Calculator)
Overtime is paid at time and a half.
In one week she works 4 hours of overtime.
Work out her total pay for that week.

Normal pay: 37 × £15.50 = £573.50
Overtime rate: £15.50 × 1.5 = £23.25 per hour
Overtime pay: 4 × £23.25 = £93
Total: £573.50 + £93 = £666.50
Answer: £666.50