Day 100 **B Tier 10-a-day: Model Solutions**

1 Solving equations

Solve $14 - 7n = -21$

Add 7n to both sides: $14 = -21 + 7n$
Subtract -21 from both sides: $35 = 7n$
Divide both sides by 7
Answer: n = 5

2 Compound areas

A rectangular pond is 12 m by 13 m.
There is a path of width 2 m all the way round the outside of the pond.
Work out the area of the path.

Outer rectangle: $(12 + 4) \times (13 + 4) = 16 \times 17 = 272$
Pond: $12 \times 13 = 156$
$272 - 156 = 116$
Answer: 116 m^2

3 Multiplying and dividing

Work out 235×34

Split 34 into 30 + 4
$235 \times 30 = 7050$
$235 \times 4 = 940$
$7050 + 940 = 7990$
Answer: 7990

4 Map scales

On a map, 1 cm represents 1 km.
A lake is 15.5 cm long on the map.
Work out the real length of the lake.

$15.5 \times 1 = 15.5$
Answer: 15.5 km

5 Mixed numbers

Work out $1\frac{3}{4} + 2\frac{5}{8}$

Give your answer as a mixed number.

Whole numbers: $1 + 2 = 3$
Fractions: $\frac{3}{4} + \frac{5}{8} = \frac{11}{8} = 1\frac{3}{8}$
Total = $4\frac{3}{8}$
Answer: $4\frac{3}{8}$

6 Equations with brackets

Solve $3(3x + 8) = 60$

Divide both sides by 3: $3x + 8 = 20$
Subtract 8 from both sides: $3x = 12$
Divide both sides by 3
Answer: x = 4

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7 Two-way tables

The table shows some information about 51 members of a leisure centre.
A person is chosen at random.
Find the probability that the person is in the group "Children" and chose "Swim".

Children who chose Swim = 51 − 33 − 11 = 7
P = 7 out of 51
Answer: $\frac{7}{51}$

8 LCM problems

Two buses leave a bus station at 10:30.
One bus leaves every 20 minutes.
The other bus leaves every 24 minutes.
At what time do both buses next leave together?

Multiples of 20: 20, 40, 60, 80, 100, 120
Multiples of 24: 24, 48, 72, 96, 120
The first common multiple is 120, so the LCM is 120 minutes
10:30 + 120 minutes = 12:30
Answer: 12:30

9 Trigonometry: finding a side

Find the length of t. (Calculator)
Give your answer correct to 1 decimal place.
The diagram is not drawn accurately.

Label the sides: t is the adjacent and 25 cm is the opposite
We use tan (opposite and adjacent)

$\tan 41° = \frac{25}{t}$

$t = \frac{25}{\tan 41°} = 28.759...$

t = 28.8 cm (1 d.p.)
Answer: t = 28.8 cm

10 Interior angles of regular polygons

Work out the sum of the interior angles of a polygon with 18 sides.

Sum = (n − 2) × 180°
(18 − 2) × 180 = 16 × 180 = 2880°
Answer: 2880°