Day 39 **B Tier 10-a-day: Model Solutions**

1 Angles on a line and round a point

The diagram shows 2 angles on a straight line.
Work out the value of n.
The diagram is not drawn accurately.

Angles on a straight line add up to 180°
(3n + 85) + (3n + 35) = 180
6n + 120 = 180
6n = 60
n = 60 ÷ 6 = 10
Answer: n = 10°

2 Forming equations

I think of a number.
I multiply it by 3 and then subtract 1.
The answer is 29.
Work out my number.

Let the number be n: 3n − 1 = 29
Add 1: 3n = 30
Divide by 3
Answer: 10

3 Metric units

(a) Change 8.6 m to mm.
(b) Change 3415 m to km.

(a) 1 m = 1000 mm, so multiply by 1000: 8.6 × 1000 = 8600
(b) 1 km = 1000 m, so divide by 1000: 3415 ÷ 1000 = 3.415
Answer: (a) 8600 mm (b) 3.415 km

4 Compound areas

Two rectangles are joined to make a shape.
The first is 3 cm by 7 cm.
The second is 14 cm by 14 cm.
Work out the total area of the shape.

First rectangle: 3 × 7 = 21
Second rectangle: 14 × 14 = 196
21 + 196 = 217
Answer: 217 cm^2

5 Real-life graphs

A printing company charges a set-up fee plus a cost for each box of leaflets.
The graph shows the total cost.
(a) Write down the fixed charge.
(b) Work out the cost for each box.

(a) The fixed charge is the cost when nothing has been used, where the line meets the vertical axis
(b) Take two points on the line, for example (0, 2) and (4, 18)
Cost for each box = (18 − 2) ÷ 4 = 4
Answer: (a) £2 (b) £4

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6 Two-way tables

The table shows some information about 82 students.
One person from the group "Year 11" is chosen at random.
Find the probability that this person chose "Pizza".

Year 11 total = 82 − 32 = 50
Year 11 who chose Pizza = 50 − 22 = 28
P = 28 out of 50

Answer: $\frac{14}{25}$

7 Repeated percentage change

The price of a laptop is £120.
The price is first reduced by 30%, then the new price is reduced by 25%.
(a) Work out the final price.
(b) Work out the overall percentage decrease in the price.

(a) Multipliers: 0.7 and 0.75
120 × 0.7 × 0.75 = £63
(b) Overall multiplier = 0.525
Overall decrease = 47.5%
Answer: (a) £63 (b) 47.5% decrease

8 Pay and overtime

Priya earns £8 per hour for the first 35 hours worked each week.
Any extra hours are paid at double time.
Last week Priya worked 39 hours.
Work out Priya's total pay for last week.

Normal pay: 35 × £8 = £280
Overtime rate: 2 × £8 = £16 per hour
Overtime pay: 4 × £16 = £64
Total = £280 + £64 = £344
Answer: £344

9 Error intervals

The number x is rounded to the nearest 10.
The result is 290.
Write down the error interval for x.

The rounding unit is 10, so x can be up to half of this, 5, either side of 290
Lower bound = 290 − 5 = 285 and upper bound = 290 + 5 = 295
Answer: $285 \leq x < 295$

10 Changing the subject

Make S the subject of the formula

$D = \frac{S}{T}$

Multiply both sides by T
Answer: S = DT