Day 30 **B Tier 10-a-day: Model Solutions**

1 Factorising

Factorise 15x + 18

The highest common factor of 15 and 18 is 3
Divide each term by 3: 5x + 6
Answer: 3(5x + 6)

2 Money

Kofi buys 5 pens at £1.50 each and 2 sandwiches at £1.65 each.
He pays with a £20 note.
Work out how much change he gets.

5 × £1.50 = £7.50
2 × £1.65 = £3.30
Total = £7.50 + £3.30 = £10.80
Change = £20 − £10.80 = £9.20
Answer: £9.20

3 Forming equations

I think of a number.
I multiply it by 6 and then subtract 10.
The answer is 50.
Work out my number.

Let the number be n: 6n − 10 = 50
Add 10: 6n = 60
Divide by 6
Answer: 10

4 Two-way tables

The table shows some information about 57 members of a leisure centre.
One person from the group "Children" is chosen at random.
Find the probability that this person chose "Swim".

Children total = 57 − 27 = 30
Children who chose Swim = 30 − 25 = 5
P = 5 out of 30
Answer: $\frac{1}{6}$

5 Powers and roots

Work out
(a) $\sqrt[3]{64} \times 6$
(b) the square root of 36

(a) $\sqrt[3]{64} = 4$ because 4 × 4 × 4 = 64, so 4 × 6 = 24
(b) 6 × 6 = 36, so the square root is 6
Answer: (a) 24 (b) 6

6 Fuel use

A car uses 50 litres of petrol to travel 600 km.
Work out how many kilometres it travels on each litre of petrol.

600 ÷ 50 = 12
Answer: 12 km per litre

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7 Growth in standard form

There are 8.7×10^6 bacteria in a dish.
The number doubles every day.
How many are there after 5 days?
Give your answer in standard form.

Each day multiply by 2, so multiply by $2^5 = 32$

$8.7 \times 10^6 \times 32 = 278.4 \times 10^6$

In standard form: 2.784×10^8

Answer: 2.784×10^8

8 Arc length and sector area

The diagram shows a sector of a circle with radius 4 m and angle 120°. (Calculator)
Work out the length of the arc of the sector.
Give your answer correct to 1 decimal place.
The diagram is not drawn accurately.

Arc length = $\frac{120}{360} \times 2 \times \pi \times 4$

= 8.378... = 8.4 m (1 d.p.)

Answer: 8.4 m

9 Iteration

Here is an iteration formula.

$x_{n+1} = 5 + \frac{8}{x_n}$

$x_0 = 2$

(a) Work out x_1

(b) Work out x_2. Give your answer correct to 3 decimal places. (Calculator)

(a) $x_1 = 5 + \frac{8}{2} = 5 + 4 = 9$

(b) $x_2 = 5 + \frac{8}{9} = 5.88889...$

= 5.889

Answer: (a) 9 (b) 5.889

10 Chords and the centre of a circle

A circle has centre O and radius 9 m. (Calculator)
AB is a chord and M is the midpoint of AB. OM is perpendicular to AB.
Work out the value of x. Give your answer correct to 1 decimal place.
The diagram is not drawn accurately.

AM = 8 ÷ 2 = 4

Triangle OMA has a right angle at M, and OA is the hypotenuse

$x^2 = 9^2 - 4^2 = 81 - 16 = 65$

$x = \sqrt{65} = 8.062...$

x = 8.1 m (1 d.p.)

Answer: x = 8.1 m