Day 207 **B Tier 10-a-day: Model Solutions**

1 Money

Chloe buys 4 magazines at £2.85 each and 2 pens at £1.35 each.
She pays with a £20 note.
Work out how much change she gets.

4 × £2.85 = £11.40
2 × £1.35 = £2.70
Total = £11.40 + £2.70 = £14.10
Change = £20 − £14.10 = £5.90
Answer: £5.90

2 Interior angles of regular polygons

Work out the size of one interior angle of a regular octagon.

Exterior angle = 360° ÷ 8 = 45°
Interior angle = 180° − 45° = 135°
Answer: 135°

3 Cost formulae

A gym charges a joining fee of £39 and £10 for each month of membership.
(a) Work out the total cost for 4 months.
(b) The total cost is £119. Work out the number of months.

(a) 10 × 4 = 40, then 39 + 40 = 79
(b) Take off the fixed charge: 119 − 39 = 80
Divide by the cost for each: 80 ÷ 10 = 8
Answer: (a) £79 (b) 8

4 Volume of cuboids

A cuboid has volume 168 cm^3.
The length of the cuboid is 7 cm and the width is 6 cm.
Work out the height of the cuboid.

Volume = length × width × height
168 = 7 × 6 × height
168 = 42 × height
Height = 168 ÷ 42 = 4
Answer: 4 cm

5 Significant figures

Work out the value of this expression. (Calculator)

$$\frac{2.2^3}{7.6}$$

Give your answer correct to 3 significant figures.

Use a calculator: the full display is 1.401053...
Round to 3 significant figures: 1.40
Answer: 1.40

6 Algebraic fractions

Simplify fully $\frac{6x + 12}{2}$

Factorise the top: 2(3x + 6)
Cancel the 2 on the top and bottom
Answer: 3x + 6

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7 Sample space of two dice

Two fair six-sided spinners are spun.
Work out the probability that the total score is less than 5.

There are 6 × 6 = 36 equally likely outcomes
Totals below 5: (1,1), (1,2), (1,3), (2,1), (2,2), (3,1)
P = 6 out of 36

Answer: $\frac{1}{6}$

8 Fraction problems

A water tank is $\frac{1}{3}$ full.

55 litres of water are added.

The water tank is now $\frac{1}{2}$ full.

Work out the capacity of the water tank.

Fraction added = $\frac{1}{2} - \frac{1}{3} = \frac{1}{6}$

$\frac{1}{6}$ of the capacity = 55 litres
Whole capacity = 55 × 6 = 330 litres
Answer: 330 litres

9 Tree diagrams

A bag contains 6 red counters and 6 blue counters.
Ella takes one at random, replaces it, then takes a second.
Work out the probability that the two are the same colour.

P(both red) = $\frac{1}{4}$

P(both blue) = $\frac{1}{4}$

Add: $\frac{1}{4} + \frac{1}{4} = \frac{1}{2}$

Answer: $\frac{1}{2}$

10 Trigonometry: finding a side

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

Label the sides: x is the adjacent and 14 m is the opposite
We use tan (opposite and adjacent)

$\tan 32° = \frac{14}{x}$

$x = \frac{14}{\tan 32°} = 22.405...$

x = 22.4 m (1 d.p.)
Answer: x = 22.4 m