Day 56 **B Tier 10-a-day: Model Solutions**

1 Volume of a prism

This prism has a right-angled triangle as its cross-section.
Work out the volume of the prism.
The diagram is not drawn accurately.

Area of cross-section = ½ × 8 × 6 = 24
Volume of prism = area of cross-section × length
24 × 10 = 240
Answer: 240 m^3

2 Probability of not happening

The probability that it will rain on Saturday is 0.9.
Work out the probability that it will not rain on Saturday.

Probabilities add up to 1
1 − 0.9 = 0.1
Answer: 0.1

3 The nth term

Here are the first four terms of a sequence.
32, 30, 28, 26
Find an expression, in terms of n, for the nth term of this sequence.

The terms go down by 2 each time, so the nth term starts with −2n
When n = 1: −2 and the first term is 32, so we need to add 34
nth term = −2n + 34
Answer: −2n + 34

4 Using a given calculation

Use the fact that 16 × 17 = 272
to work out
(a) 1.6 × 17
(b) 27,200 ÷ 160

(a) 1.6 = 16 ÷ 10 and 17 is unchanged
So the answer is 272 ÷ 10 = 27.2
(b) 27,200 = 272 × 100 and 160 = 16 × 10
272 ÷ 16 = 17, so the answer is 17 × 10 = 170
Answer: (a) 27.2 (b) 170

5 Pay and overtime

Maya earns £18 per hour for the first 32 hours worked each week.
Any extra hours are paid at double time.
Last week Maya worked 37 hours.
Work out Maya's total pay for last week.

Normal pay: 32 × £18 = £576
Overtime rate: 2 × £18 = £36 per hour
Overtime pay: 5 × £36 = £180
Total = £576 + £180 = £756
Answer: £756

6 Harder linear equations

Solve 11 − 2x = 4x + 17

Add 2x to both sides: 11 = 6x + 17
Subtract 17 from both sides: −6 = 6x
Divide both sides by 6
Answer: x = −1

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7 Circle theorems

A, B and C are points on a circle, centre O.
Angle AOB = 120°.
Work out the size of angle ACB, marked a.
Give a reason for your answer.
The diagram is not drawn accurately.

The angle at the centre is twice the angle at the circumference
a = 120 ÷ 2 = 60°
Answer: a = 60°

8 Compound percentages

Priya invests £5000 in a savings account. (Calculator)
The account pays 5% compound interest per year.
Work out the amount in the account after 2 years.
Give your answer to the nearest penny.

Multiplier = 1 + 5% = 1.05
Amount = 5000×1.05^2
= £5512.50
Answer: £5512.50

9 Tree diagrams

A bag contains 4 red counters and 6 blue counters.
Isla takes one at random and does not replace it, then takes a second.
Work out the probability that the two are different colours.

P(red then blue) = $\frac{4}{15}$

P(blue then red) = $\frac{4}{15}$

Add: $\frac{4}{15} + \frac{4}{15} = \frac{8}{15}$

Answer: $\mathbf{\frac{8}{15}}$

10 Difference of two squares

Factorise $y^2 - 121$

$121 = 11^2$, so this is a difference of two squares
$y^2 - 11^2 = (y - 11)(y + 11)$
Answer: $(y - 11)(y + 11)$