Day 240 **B Tier 10-a-day: Model Solutions**

1 Substitution into formulae

Here is a formula.
P = 2l + 2w
Work out the value of P when l = 5 and w = 4

P = 2 × 5 + 2 × 4
P = 18
Answer: P = 18

2 Angles on a line and round a point

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

Angles on a straight line add up to 180°
2c + (2c + 36) = 180
4c + 36 = 180
4c = 144
c = 144 ÷ 4 = 36
Answer: c = 36°

3 Currency conversion

£1 = 1.4 dollars
(a) Change £80 into dollars.
(b) Change $210 into pounds.

(a) 80 × 1.4 = 112
(b) Divide by the rate: 210 ÷ 1.4 = 150
Answer: (a) $112 (b) £150

4 Exchange rates

The exchange rate is £1 = $1.3. (Calculator)
(a) Change £60 to dollars.
(b) Change $208 to pounds (£).

(a) Multiply by 1.3: 60 × 1.3 = $78
(b) Divide by 1.3: 208 ÷ 1.3 = £160
Answer: (a) $78 (b) £160

5 Cost formulae

A gym charges a joining fee of £15 and £6 for each month of membership.
(a) Work out the total cost for 9 months.
(b) The total cost is £51. Work out the number of months.

(a) 6 × 9 = 54, then 15 + 54 = 69
(b) Take off the fixed charge: 51 − 15 = 36
Divide by the cost for each: 36 ÷ 6 = 6
Answer: (a) £69 (b) 6

6 Circle theorems

A, B and C are points on a circle.
AB is a diameter of the circle.
Angle CAB = 52°.
Work out the size of angle x.
Give a reason for each step of your working.
The diagram is not drawn accurately.

Angle ACB = 90° (the angle in a semicircle is a right angle)
x = 180 − 90 − 52 = 38°
(angles in a triangle add up to 180°)
Answer: x = 38°

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7 Ratio and changes

In a room, the ratio of red counters to blue counters is 5 : 9.
There are 63 blue counters.
More red counters join so that there are equal numbers of red counters and blue counters.
How many red counters join?

9 parts = 63, so 1 part = 7
Originally there are 5 × 7 = 35 red counters
To equal 63, add 63 − 35 = 28
Answer: 28

8 Radius from area or circumference

The circumference of a circle is 22π m.
Work out the radius of the circle.

Circumference = 2πr, so 2r = 22
r = 22 ÷ 2 = 11
Answer: 11 m

9 Ordering decimals

Write these numbers in order of size.
Start with the smallest number.
2.6, 2.58, 2.66, 2.644

Write each number to 3 decimal places:
2.600, 2.580, 2.660, 2.644
Now put them in order: 2.580, 2.600, 2.644, 2.660
Answer: 2.58, 2.6, 2.644, 2.66

10 Bounds

The length of a rectangle is 10 cm and its width is 11 cm.
Both measurements are correct to the nearest cm.
Work out the upper bound for the perimeter of the rectangle.

Upper bound of each side = value + 0.5: 10.5 cm and 11.5 cm
Perimeter = 2 × (10.5 + 11.5) = 44 cm
Answer: 44 cm