Day 281 **B Tier 10-a-day: Model Solutions**

1 Money

Tom buys 4 sandwiches at £1.20 each and 4 bottles of juice at £1.45 each.
He pays with a £50 note.
Work out how much change he gets.

4 × £1.20 = £4.80
4 × £1.45 = £5.80
Total = £4.80 + £5.80 = £10.60
Change = £50 − £10.60 = £39.40
Answer: £39.40

2 Solving double inequalities

(a) Solve $-10 \leq 4x + 2 \leq 2$
(b) Write down the integer values of x that satisfy this inequality.

(a) Subtract 2 in all three parts: $-12 \leq 4x \leq 0$
Divide all three parts by 4: $-3 \leq x \leq 0$
(b) The whole numbers in this range are −3, −2, −1, 0
Answer: (a) $-3 \leq x \leq 0$ (b) −3, −2, −1, 0

3 Percentages of amounts

Work out
(a) 35% of £180
(b) 60% of 400

(a) 10% of £180 = £18
5% of £180 = £9
35% = 3 × £18 + £9 = £63
(b) 10% of 400 = 40
60% = 6 × 40 = 240
Answer: (a) £63 (b) 240

4 Pythagoras' theorem

Calculate the length of t.
The diagram is not drawn accurately.

Use Pythagoras: $a^2 + b^2 = c^2$
$t^2 = 4^2 + 3^2 = 16 + 9 = 25$
$t = \sqrt{25} = 5$
Answer: t = 5 cm

5 Significant figures

Work out the value of this expression. (Calculator)

$$\frac{8.8 + 7.1}{9.4 \times 3.5}$$

Give your answer correct to 3 significant figures.

Use a calculator: the full display is 0.483283...
Round to 3 significant figures: 0.483
Answer: 0.483

6 Direct proportion

C is directly proportional to t.
When t = 8, C = 72.
Find the value of C when t = 20.

C = kt
72 = k × 8, so k = 72 ÷ 8 = 9
C = 9 × 20 = 180
Answer: C = 180

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7 Circle theorems

A, B and C are points on a circle, centre O.
Angle ACB = 60°.
Work out the size of angle AOB, marked b.
Give a reason for your answer.
The diagram is not drawn accurately.

The angle at the centre is twice the angle at the circumference
b = 2 × 60 = 120°
Answer: b = 120°

8 Stratified sampling

A stratified sample of 20 students is taken from the 400 students in the table.
Work out how many students should be sampled from Group A.

Sample fraction = 20 ÷ 400
Group A: 120 ÷ 400 × 20 = 6
Answer: 6

9 Cost formulae

A gym charges a joining fee of £16 and £13 for each month of membership.
(a) Work out the total cost for 4 months.
(b) The total cost is £120. Work out the number of months.

(a) 13 × 4 = 52, then 16 + 52 = 68
(b) Take off the fixed charge: 120 − 16 = 104
Divide by the cost for each: 104 ÷ 13 = 8
Answer: (a) £68 (b) 8

10 Tree diagrams

A bag contains 4 green beads and 7 yellow beads.
Ben takes one at random and does not replace it, then takes a second.
Work out the probability that the two are different colours.

P(green then yellow) = $\frac{14}{55}$

P(yellow then green) = $\frac{14}{55}$

Add: $\frac{14}{55} + \frac{14}{55} = \frac{28}{55}$

Answer: $\frac{28}{55}$