Day 177 **B Tier 10-a-day: Model Solutions**

1 Surface area of cuboids

A cuboid measures 5 cm by 8 cm by 4 cm.
Work out the total surface area.

Top and bottom: $2 \times 5 \times 8 = 80$
Front and back: $2 \times 5 \times 4 = 40$
Two sides: $2 \times 8 \times 4 = 64$
$80 + 40 + 64 = 184$
Answer: 184 cm^2

2 Integer inequalities

n is an integer.
Write down all the values of n for which
$-6 \leq n \leq -2$

List the whole numbers between -6 and -2
Include -6 only if the sign is $\leq$, and -2 only if the sign is $\leq$
Answer: $-6, -5, -4, -3, -2$

3 Area of 2D shapes

This is a parallelogram.
Find the area of the parallelogram.
The diagram is not drawn accurately.

Area of a parallelogram = base × perpendicular height
The slanting side is not needed
$13 \times 4 = 52$
Answer: 52 cm^2

4 Mode and median from a table

The table shows the shoe sizes of students in a class.
(a) Write down the mode.
(b) Work out the median.

(a) The highest frequency is 10, for 6
(b) Total frequency = 37, so the median is the number 19 value
Running totals of frequency: 2, 12, 17, 20, 29, 37
The median is 8
Answer: (a) 6 (b) 8

5 Compound areas

A rectangular pond is 9 m by 7 m.
There is a path of width 1 m all the way round the outside of the pond.
Work out the area of the path.

Outer rectangle: $(9 + 2) \times (7 + 2) = 11 \times 9 = 99$
Pond: $9 \times 7 = 63$
$99 - 63 = 36$
Answer: 36 m^2

6 Density

A lump of gold has a density of 19.3 g/cm^3 and a volume of 200 cm^3.
Work out its mass.

Mass = density × volume
$19.3 \times 200 = 3860$
Answer: 3860 g

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7 Significant figures

Work out the value of this expression. (Calculator)

$\sqrt{6^2 + 5^2}$

Give your answer correct to 3 significant figures.

Use a calculator: the full display is 7.81025...
Round to 3 significant figures: 7.81
Answer: 7.81

8 Simultaneous equations problem

A theme park sells adult tickets and child tickets.
4 adult tickets and 2 child tickets cost £78.
3 adult tickets and 2 child tickets cost £64.
Work out the cost of one adult ticket and the cost of one child ticket.

Let a = cost of one adult ticket and b = cost of one child ticket
4a + 2b = 78 and 3a + 2b = 64
Subtract: 1a = 78 − 64 = 14, so a = 14
Substitute: 4 × 14 + 2b = 78, so 2b = 22 and b = 11
Answer: One adult ticket costs £14 and one child ticket costs £11

9 Reverse repeated percentages

In a sale, the price of a sofa is reduced by 30%. (Calculator)
Two weeks later it is reduced by a further 25% of the new price.
The final price is £105.
Work out the original price of the sofa.

Multipliers: 0.7 and 0.75
Overall multiplier = 0.7 × 0.75 = 0.525
Original price = £105 ÷ 0.525 = £200
Answer: £200

10 Solving equations

Solve 6n − 12 = 30

Add 12 from both sides: 6n = 42
Divide both sides by 6
Answer: n = 7