Day 79 **B Tier 10-a-day: Model Solutions**

1 Multiplying and dividing

A school has 1624 students. They are put into equal groups of 28.
How many are in each group?

1624 ÷ 28
28 × 58 = 1624
So 1624 ÷ 28 = 58
Answer: 58

2 Expanding and simplifying

Expand and simplify 5(x + 6) + 6(x + 5)

Expand each bracket: 5x + 30 + 6x + 30
Collect like terms: 11x + 60
Answer: 11x + 60

3 Ratio, one part known

The ratio of boys to girls among the students in a class is 8 : 9.
There are 45 girls.
How many boys are there?

9 parts = 45 girls
1 part = 45 ÷ 9 = 5
boys: 8 × 5 = 40
Answer: 40

4 Circumference and area of a circle

The diagram shows a circle with radius 3 mm.
Work out the area of the circle.
Give your answer in terms of π.
The diagram is not drawn accurately.

Area = π × radius^2
π × 3^2 = 9π
Answer: 9π mm^2

5 Scatter graphs

The scatter graph shows information about age of car and value.
A line of best fit is drawn.
(a) Describe the correlation.
(b) Use the line of best fit to estimate the value when age of car is 5.

(a) As one variable goes up, the other goes down
This is negative correlation
(b) Go up from 5 on the horizontal axis to the line, then across to the vertical axis
The reading is about £13 000
Answer: (a) Negative correlation (b) about £13 000

6 Area of shaded regions

The diagram shows a rectangle 23 cm by 13 cm with a circle of radius 2 cm cut out. (Calculator)
The circle is in the centre of the rectangle.
Work out the area of the shaded region.
Give your answer correct to 1 decimal place.
The diagram is not drawn accurately.

Area of rectangle = 23 × 13 = 299
Area of circle = π × 2^2 = 4π
Shaded area = 299 − 4π = 286.434... = 286.4 cm^2 (1 d.p.)
Answer: 286.4 cm^2

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7 Place value

Here are four digit cards.
4 9 3 7
Use all four cards to make the largest possible even number.

The last digit must be even. Put the biggest remaining digits first.
The largest even number is 9734
Answer: 9734

8 Circle theorems

A and B are points on a circle, centre O.
Angle AOB = 114°.
Work out the size of angle b.
Give a reason for your answer.
The diagram is not drawn accurately.

OA = OB because they are radii, so triangle OAB is isosceles
b = (180 − 114) ÷ 2 = 33
The base angles of an isosceles triangle are equal
Answer: b = 33°

9 Tree diagrams

A bag contains 3 green beads and 5 yellow beads.
Nia takes one at random, replaces it, then takes a second.
Work out the probability that both are green.

P(first green) = $\frac{3}{8}$

P(second green) = $\frac{3}{8}$

P(both green) = $\frac{3}{8} \times \frac{3}{8} = \frac{9}{64}$

Answer: $\frac{9}{64}$

10 Simultaneous equations problem

A theme park sells adult tickets and child tickets.
2 adult tickets and 2 child tickets cost £50.
4 adult tickets and 2 child tickets cost £84.
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
2a + 2b = 50 and 4a + 2b = 84
Subtract: 2a = 84 − 50 = 34, so a = 17
Substitute: 2 × 17 + 2b = 50, so 2b = 16 and b = 8
Answer: One adult ticket costs £17 and one child ticket costs £8