Day 318 **B Tier 10-a-day: Model Solutions**

1 Place value

Here are four digit cards.
6 1 9 3
Use all four cards to make the largest possible number.
Work out the difference between the largest and smallest possible numbers.

Largest: put the digits in order, biggest first: 9631
Smallest: put the digits in order, smallest first: 1369
9631 − 1369 = 8262
Answer: 8262

2 Bar charts

The bar chart shows some information.
(a) Which bar is the shortest?
(b) What percentage of the total is Banana?

(a) The shortest bar is Orange
(b) Total = 100
30 ÷ 100 × 100 = 30%
Answer: (a) Orange (b) 30%

3 Perimeter and area of compound shapes

The diagram shows the shape of a playground.
All the corners are right angles. All lengths are in cm.
(a) Find the perimeter.
(b) Find the area.

(a) Missing lengths: 19 − 6 = 13 and 15 − 6 = 9
Perimeter = 19 + 6 + 13 + 9 + 6 + 15 = 68
(b) Split into two rectangles: 19 × 6 = 114 and 6 × 9 = 54
114 + 54 = 168
Answer: (a) 68 cm (b) 168 cm^2

4 Comparing fractions and percentages

Tom has $\frac{1}{4}$ of £136.

Priya has 45% of £80.
Who has more money? You must show your working.

Tom: 136 ÷ 8 × 2 = £34
Priya: 80 ÷ 100 × 45 = £36
£36 is more than £34, so Priya has more
Answer: Priya

5 Sample space of two dice

Two fair six-sided spinners are spun.
Work out the probability that both spinners show the same number.

There are 6 × 6 = 36 equally likely outcomes
Matching pairs: 1-1, 2-2, 3-3, 4-4, 5-5, 6-6
P = 6 out of 36
Answer: $\frac{1}{6}$

6 Loci

AB is a straight fence 10 m long.
A path is always exactly 2 m from the fence AB, on both sides, and also goes round each end.
Describe the shape of the path.

On each side, the path is a straight line parallel to AB, 2 m away
At each end the path is a semicircle of radius 2 m
Answer: Two parallel lines 10 m long, joined at each end by a semicircle of radius 2 m

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7 Tables of values for quadratics

Complete the table of values for $y = x^2 - x - 4$

$x = -2$: $y = (-2)^2 + (-1) \times (-2) + (-4) = 2$

$x = -1$: $y = (-1)^2 + (-1) \times (-1) + (-4) = -2$

$x = 0$: $y = 0^2 + (-1) \times 0 + (-4) = -4$

$x = 1$: $y = 1^2 + (-1) \times 1 + (-4) = -4$

Answer: x = −2: 2, x = −1: −2, x = 0: −4, x = 1: −4

8 Scaling a recipe

Here are the amounts needed to make a fruit crumble for 4 people.
60 g of sugar, 100 g of butter
Work out the amounts needed to make a fruit crumble for 7 people.

For 1 person: 60 ÷ 4 = 15 g and 100 ÷ 4 = 25 g

For 7 people: 15 × 7 = 105 and 25 × 7 = 175

Answer: 105 g of sugar, 175 g of butter

9 Standard form calculations

A spacecraft travels at 7×10^7 km per hour.
It travels for 4.1×10^2 hours at this speed.
Work out how far it travels.
Give your answer in standard form.

Distance = speed × time

$(7 \times 10^7) \times (4.1 \times 10^2) = 28.7 \times 10^9$

In standard form: 2.87×10^{10}

Answer: 2.87×10^{10} km

10 Gradient of a line

Work out the gradient of the straight line that passes through the points (5, 3) and (9, 11).

$$\text{Gradient} = \frac{\text{change in y}}{\text{change in x}}$$

Change in y = 11 − 3 = 8

Change in x = 9 − 5 = 4

$$\text{Gradient} = \frac{8}{4} = 2$$

Answer: 2