Day 216 **B Tier 10-a-day: Model Solutions**

1 Powers and roots

Work out

(a) $2^2 + 4^3$

(b) $\sqrt{9} - 4^2$

(a) $2^2 = 4$ and $4^3 = 64$, so $4 + 64 = 68$

(b) $\sqrt{9} = 3$ and $4^2 = 16$, so $3 - 16 = -13$

Answer: (a) 68 (b) −13

2 Tables of values

Complete the table of values for $y = -4x + 6$

$x = 2$: $y = -4 \times 2 + 6 = -2$

$x = 3$: $y = -4 \times 3 + 6 = -6$

$x = 4$: $y = -4 \times 4 + 6 = -10$

Answer: x = 2: −2, x = 3: −6, x = 4: −10

3 Metric units

A jug holds 2.2 litres of juice.

Each glass holds 200 ml.

How many glasses can be filled from the jug?

2.2 litres = $2.2 \times 1000 = 2200$ ml

$2200 \div 200 = 11$

Answer: 11 glasses

4 Reflection

The diagram shows triangle ABC on a grid.

(a) Write down the coordinates of the image of B after a reflection in the line $x = 2$.

(b) Write down the coordinates of the image of C after a reflection in the y-axis.

(a) B is at (1, 3). Reflect in the line $x = 2$: (3, 3)

(b) C is at (2, 1). Reflect in the y-axis: (−2, 1)

Answer: (a) (3, 3) (b) (−2, 1)

5 Expanding double brackets

Expand and simplify $(2x - 1)(x + 4)$

Multiply every term in the first bracket by every term in the second:

$2x^2 + 8x - x - 4$

Collect the x terms: $2x^2 + 7x - 4$

Answer: $2x^2 + 7x - 4$

6 Reading pie charts

The pie chart shows the favourite choices of 72 people.

The angle for Maths is not shown.

Work out how many people chose Maths.

Angle for Maths = $360° - (30° + 80° + 160°) = 360° - 270° = 90°$

$90 \div 360 \times 72 = 18$

Answer: 18

Day 216 **B Tier 10-a-day: Model Solutions**

7 Area of shaded regions

The diagram shows a rectangle 15 m by 10 m with a circle of radius 3 m cut out.
The circle is in the centre of the rectangle.
Work out the area of the shaded region.
Give your answer in terms of π.
The diagram is not drawn accurately.

Area of rectangle = 15 × 10 = 150
Area of circle = $\pi \times 3^2 = 9\pi$
Shaded area = $150 - 9\pi$
Answer: $150 - 9\pi$ m^2

8 Place value

Here are four digit cards.
3 2 5 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 7532
Answer: 7532

9 Best buys

Pasta is sold in two sizes.
Small: 500 g for £1
Large: 750 g for £1.72
Which size is better value for money?
You must show your working.

Compare the cost of 1500 g of each
Large: 2 × £1.72 = £3.44
Small: 3 × £1 = £3
The small is cheaper for the same amount
Answer: The small size

10 Equations with fractions

Solve $\frac{3x + 2}{5} = 4$

Multiply both sides by 5: 3x + 2 = 20
Subtract 2 from both sides: 3x = 18
Divide both sides by 3
Answer: x = 6