**Day 51** **B Tier 10-a-day: Model Solutions**

## 1 Collecting like terms

Simplify $5p + 8q - 6p - 6q$

Collect the p terms: $5p - 6p = -p$
Collect the q terms: $8q - 6q = 2q$
**Answer: $-p + 2q$**

## 2 Interior angles of regular polygons

A regular polygon has 18 sides.
(a) Work out the size of one exterior angle.
(b) Work out the size of one interior angle.

(a) Exterior angles add up to 360°, so $360 \div 18 = 20°$
(b) Interior angle = $180 - 20 = 160°$
**Answer: (a) 20° (b) 160°**

## 3 Sharing in a ratio

Aisha, Zain and Amy share 168 marbles in the ratio 2 : 5 : 5.
Work out how many Aisha gets.

2 + 5 + 5 = 12 parts
1 part = $168 \div 12 = 14$
Aisha gets $2 \times 14 = 28$
**Answer: 28**

## 4 Types of number

Here is a list of numbers.
10, 76, 53, 41, 4, 59, 70, 51
From the list, write down
(a) a multiple of 7
(b) an odd number that is not prime

(a) 70 ($7 \times 10$) is in the 7 times table
(b) 51 is odd but has more than two factors
**Answer: (a) 70 (b) 51**

## 5 Equations with brackets

Solve $2(2x + 3) = 26$

Divide both sides by 2: $2x + 3 = 13$
Subtract 3 from both sides: $2x = 10$
Divide both sides by 2
**Answer: $x = 5$**

## 6 Independent events

A fair 6-sided dice and a fair 8-sided dice are each rolled once.
Each dice is numbered from 1.
Work out the probability that both dice show a number greater than 2.

P(first greater than 2) = $\frac{2}{3}$

P(second greater than 2) = $\frac{3}{4}$

Multiply: $\frac{2}{3} \times \frac{3}{4} = \frac{1}{2}$

**Answer: $\frac{1}{2}$**

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## 7 Points on a line

The point $(-4, k)$ lies on the line $y = -x + 3$
Work out the value of k.

Substitute $x = -4$: $k = -1 \times (-4) + 3$
$k = 7$
**Answer: k = 7**

## 8 Area of shaded regions

The diagram shows two circles with the same centre.
The radius of the larger circle is 13 cm.
The radius of the smaller circle is 7 cm.
Work out the area of the shaded region.
Give your answer in terms of $\pi$.
The diagram is not drawn accurately.

Area of large circle = $\pi \times 13^2 = 169\pi$
Area of small circle = $\pi \times 7^2 = 49\pi$
$169\pi - 49\pi = 120\pi$
**Answer: $120\pi$ cm$^2$**

## 9 Unitary method

9 rulers cost £5.40.
Work out the cost of 7 rulers.

1 ruler costs £5.40 ÷ 9 = 60p
7 rulers cost 7 × 60p = £4.20
**Answer: £4.20**

## 10 Estimation

Estimate the value of

$$\frac{3.79}{3.79} + 3.96$$

Show your rounding to 1 significant figure.

Round each number to 1 significant figure: 3.79 → 4, 3.96 → 4, 3.79 → 4
Estimate = 4 ÷ 4 + 4 = 5
**Answer: 5**