Day 201 **B Tier 10-a-day: Model Solutions**

1 Faces, edges and vertices

Write down the number of faces and vertices of a cuboid.

Faces: top, bottom and 4 sides = 6
Vertices: 4 on the top and 4 on the bottom = 8
Answer: faces: 6 vertices: 8

2 Probability of not happening

The probability that a bus is late is $\frac{13}{20}$.

Work out the probability that a bus is not late.

Probabilities add up to 1

$1 - \frac{13}{20} = \frac{7}{20}$

Answer: $\frac{7}{20}$

3 Percentages of amounts

Work out
(a) 20% of £180
(b) 40% of 640

(a) 10% of £180 = £18
20% = 2 × £18 = £36
(b) 10% of 640 = 64
40% = 4 × 64 = 256
Answer: (a) £36 (b) 256

4 Reading pie charts

The pie chart shows the favourite choices of 72 people.
The angle for Football is not shown.
Work out how many people chose Football.

Angle for Football = 360° − (30° + 120° + 80°) = 360° − 230° = 130°
130 ÷ 360 × 72 = 26
Answer: 26

5 Loci

A point P is always exactly 6 m from a sprinkler, L.
Describe the locus of the point P.

The points are all the same distance from L
This forms a circle
Answer: A circle with centre L and radius 6 m

6 Changing the subject

Make n the subject of the formula

$C = \frac{n + 12}{4}$

Multiply both sides by 4: 4C = n + 12
Subtract 12 from both sides
Answer: n = 4C − 12

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7 Wages and overtime

Will is paid £13 per hour for a 37 hour week. (Calculator)
Overtime is paid at time and a half.
In one week he works 8 hours of overtime.
Work out his total pay for that week.

Normal pay: 37 × £13 = £481
Overtime rate: £13 × 1.5 = £19.50 per hour
Overtime pay: 8 × £19.50 = £156
Total: £481 + £156 = £637
Answer: £637

8 Simultaneous equations

Solve the simultaneous equations
$x + 4y = 7$
$2x + 4y = 6$

The y terms have the same sign, so subtract the first equation from the second: $x = -1$
$x = -1$
Substitute $x = -1$ into the first equation: $4y = 7 - (-1) = 8$
$y = 2$
Answer: $x = -1$, $y = 2$

9 Bounds

The length of a rectangle is 11 cm and its width is 9 cm.
Both measurements are correct to the nearest cm.
Work out the upper bound for the perimeter of the rectangle.

Upper bound of each side = value + 0.5: 11.5 cm and 9.5 cm
Perimeter = 2 × (11.5 + 9.5) = 42 cm
Answer: 42 cm

10 Simultaneous equations problem

A cafe sells cakes and drinks. All cakes cost the same and all drinks cost the same.
3 cakes and 2 drinks cost £20.
4 cakes and 2 drinks cost £24.
Work out the cost of one cake and the cost of one drink.

Let a = cost of one cake and b = cost of one drink
$3a + 2b = 20$ and $4a + 2b = 24$
Subtract: $1a = 24 - 20 = 4$, so $a = 4$
Substitute: $3 \times 4 + 2b = 20$, so $2b = 8$ and $b = 4$
Answer: One cake costs £4 and one drink costs £4