Day 33 **B Tier 10-a-day: Model Solutions**

1 Angles in triangles

Triangle XYZ is isosceles with XY = XZ.
Angle YXZ = 68°.
Work out the size of angle XYZ.

The base angles of an isosceles triangle are equal
Angles in a triangle add up to 180°
180 − 68 = 112
112 ÷ 2 = 56
Answer: 56°

2 Solving equations

Solve n + 5 = 8

Subtract 5 from both sides
Answer: n = 3

3 Pie charts

In a pie chart showing the answers of 180 people, the angle for water is 40°.
How many people chose water?

40° out of 360° = $\frac{1}{9}$

$\frac{1}{9}$ of 180 = 20

Answer: 20

4 Prime factors

Write 60 as a product of its prime factors.
Give your answer in index form.

Divide by prime numbers, smallest first:
60 ÷ 2 = 30, 30 ÷ 2 = 15, 15 ÷ 3 = 5, 5 is prime
60 = 2 × 2 × 3 × 5
In index form: 60 = $2^2 \times 3 \times 5$
Answer: $2^2 \times 3 \times 5$

5 Venn diagrams

The Venn diagram shows information about 29 people in a street.
One of them is chosen at random.
Find the probability that the person chose neither Cats nor Dogs.

Outside both circles = 10
Total = 29
P = 10 out of 29
Answer: $\frac{10}{29}$

6 Changing the subject

Make t the subject of the formula
v = u + at

Subtract u from both sides: v − u = at
Divide both sides by a
Answer: $t = \frac{v - u}{a}$

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7 Trigonometry: finding a side

Work out the length of p. (Calculator)
Give your answer correct to 1 decimal place.
The diagram is not drawn accurately.

Label the sides: p is the opposite and 20 cm is the hypotenuse
We use sin (opposite and hypotenuse)

$\sin 62° = \frac{p}{20}$

$p = 20 \times \sin 62° = 17.659...$
$p = 17.7$ cm (1 d.p.)
Answer: p = 17.7 cm

8 Percentage as a fraction of

(a) Will scores 8 out of 40 in a quiz. Write this as a percentage.
(b) Write 65p as a percentage of £5.

(a) $\frac{8}{40} \times 100 = 20\%$

(b) Change both to pence: 65p and 500p

$\frac{65}{500} \times 100 = 13\%$

Answer: (a) 20% (b) 13%

9 Tables of values for quadratics

Complete the table of values for $y = x^2 + 2x - 3$

$x = -2$: $y = (-2)^2 + 2 \times (-2) + (-3) = -3$
$x = -1$: $y = (-1)^2 + 2 \times (-1) + (-3) = -4$
$x = 2$: $y = 2^2 + 2 \times 2 + (-3) = 5$
$x = 3$: $y = 3^2 + 2 \times 3 + (-3) = 12$
Answer: x = −2: −3, x = −1: −4, x = 2: 5, x = 3: 12

10 Independent events

The probability that it rains on Saturday is 0.5.
The probability that it rains on Sunday is 0.1.
The events are independent.
Work out the probability that it rains on both days.

P(both) = P(Saturday) × P(Sunday)
$0.5 \times 0.1 = 0.05$
Answer: 0.05