Day 148 **B Tier 10-a-day: Model Solutions**

1 Angles in triangles

A right-angled triangle has one angle of 67°.
Work out the size of the other acute angle.

Angles in a triangle add up to 180°
180 − 90 − 67 = 23
Answer: 23°

2 Continuing sequences

Here are the first four terms of a sequence.
1, 5, 13, 25
(a) Write down the next two terms.
(b) Describe the rule for continuing the sequence.

The differences are 4, 8, 12, going up by 4 each time
Next differences: 16 then 20
25 + 16 = 41 and 41 + 20 = 61
Answer: (a) 41, 61 (b) The differences go up by 4 each time

3 Multiplying and dividing

Work out 168 × 36

Split 36 into 30 + 6
168 × 30 = 5040
168 × 6 = 1008
5040 + 1008 = 6048
Answer: 6048

4 Integer inequalities

x is an integer.
Write down the greatest value of x for which x < 6.8

The integers below 6.8 are ... 5, 6
Answer: 6

5 Loci

AB is a straight fence 6 m long.
A path is always exactly 1 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, 1 m away
At each end the path is a semicircle of radius 1 m
Answer: Two parallel lines 6 m long, joined at each end by a semicircle of radius 1 m

6 Percentage change

The number of members of a club goes from 200 to 150.
Work out the percentage decrease.

Decrease = 200 − 150 = 50

Percentage decrease = $\frac{50}{200}$ × 100 = 25%

Answer: 25% decrease

7 Combined mean

In a test, the mean mark of 6 Year 10 is 63.
The mean mark of 4 Year 11 is 53.
Work out the mean mark of all 10 students.

Total for Year 10 = 6 × 63 = 378
Total for Year 11 = 4 × 53 = 212
Overall mean = (378 + 212) ÷ 10 = 590 ÷ 10 = 59
Answer: 59

Day 148 **B Tier 10-a-day: Model Solutions**

8 Area of an isosceles trapezium

An isosceles trapezium has parallel sides of length 21 cm and 11 cm.
Each sloping side is 13 cm long.
(a) Work out the perpendicular height of the trapezium.
(b) Work out the area of the trapezium.

(a) The difference in the parallel sides is 21 − 11 = 10, so each end sticks out 5
$h^2 = 13^2 - 5^2 = 169 - 25 = 144$, so h = 12
(b) Area = ½ × (21 + 11) × 12 = 192

Answer: (a) 12 cm (b) 192 cm^2

9 Tree diagrams

A bag contains 5 black socks and 2 white socks.
Nia takes one at random, replaces it, then takes a second.
Work out the probability that the two are different colours.

P(black then white) = $\frac{10}{49}$

P(white then black) = $\frac{10}{49}$

Add: $\frac{10}{49} + \frac{10}{49} = \frac{20}{49}$

Answer: $\frac{20}{49}$

10 Speed unit conversion

A kite flies at 22 metres per second.
Work out this speed in kilometres per hour.

In 1 hour (3600 s) it travels 22 × 3600 = 79,200 m
79,200 m = 79.2 km

Answer: 79.2 km/h