Day 169 **B Tier 10-a-day: Model Solutions**

1 Area of 2D shapes

Here is a parallelogram.
Work out the area of the parallelogram.
The diagram is not drawn accurately.

Area of a parallelogram = base × perpendicular height
The slanting side is not needed
16 × 12 = 192
Answer: 192 cm^2

2 Bar charts

The bar chart shows some information.
(a) Write down the mode.
(b) What fraction of the total is Cat? Give your answer in its simplest form.

(a) The tallest bar is Cat
(b) Total = 25 + 30 + 5 + 20 + 20 = 100
Cat = 30, so the fraction is 30 out of 100
Answer: (a) Cat (b) $\frac{3}{10}$

3 Forming expressions

Leah is n years old.
Leah's sister is 6 years older.
Leah's father is 5 times as old as Leah.
(a) Write an expression, in terms of n, for the age of Leah's sister.
(b) Write an expression, in terms of n, for the sum of the ages of all three people. Give your answer in its simplest form.

(a) Leah's sister is 6 years older: n + 6
(b) Leah's father is 5n
Sum = n + (n + 6) + 5n
Collect like terms: 7n + 6
Answer: (a) n + 6 (b) 7n + 6

4 HCF and LCM

Find the (a) highest common factor (HCF), (b) lowest common multiple (LCM) of 12 and 14.

12 = 2^2 × 3 and 14 = 2 × 7
(a) HCF: multiply the primes in both lists, using the smaller power: 2
(b) LCM: use the larger power of every prime: 2^2 × 3 × 7 = 84
Answer: (a) 2 (b) 84

5 Perimeter with algebra

A rectangle has length (4x + 3) m and width (3x + 1) m.
The perimeter of the rectangle is 92 m.
(a) Work out the value of x.
(b) Work out the area of the rectangle.

(a) 2(4x + 3) + 2(3x + 1) = 92
14x + 8 = 92
14x = 84
x = 6
(b) Length = 27, width = 19, area = 27 × 19 = 513
Answer: (a) x = 6 (b) 513 m^2

Day 169 **B Tier 10-a-day: Model Solutions**

6 Direct proportion

y is directly proportional to x.
When x = 12, y = 72.
Find the value of x when y = 120.

y = kx
k = 72 ÷ 12 = 6
x = 120 ÷ 6 = 20
Answer: x = 20

7 Reverse repeated percentages

In a sale, the price of a sofa is reduced by 50%. (Calculator)
Two weeks later it is reduced by a further 25% of the new price.
The final price is £37.50.
Work out the original price of the sofa.

Multipliers: 0.5 and 0.75
Overall multiplier = 0.5 × 0.75 = 0.375
Original price = £37.50 ÷ 0.375 = £100
Answer: £100

8 Radius from area or circumference

The circumference of a circle is 89 m. (Calculator)
Work out the diameter of the circle.
Give your answer correct to 1 decimal place.

Circumference = π × diameter
Diameter = 89 ÷ π = 28.330...
= 28.3 m (1 d.p.)
Answer: 28.3 m

9 Angles and algebra

The four angles of a quadrilateral are x°, (x + 23)°, 2x° and (2x + 7)°.
Work out the size of the largest angle.

Angles in a quadrilateral add up to 360°
x + (x + 23) + 2x + (2x + 7) = 360
6x + 30 = 360
6x = 330, so x = 55
The angles are 55°, 78°, 110°, 117°
Answer: 117°

10 Average speed

A cyclist travels at 60 km/h for 1.5 hours and then at 72 km/h for 2.5 hours.
Work out its average speed for the whole journey.

Distance: 60 × 1.5 = 90 km and 72 × 2.5 = 180 km
Total distance = 270 km and total time = 4 hours
Average speed = 270 ÷ 4 = 67.5
Answer: 67.5 km/h