Day 98 **B Tier 10-a-day: Model Solutions**

1 Area of 2D shapes

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

Area of a triangle = ½ × base × height
½ × 18 × 10 = 90
Answer: 90 mm^2

2 Ratio, one part known

The ratio of red to blue among the counters in a bag is 3 : 2.
There are 6 blue.
How many red are there?

2 parts = 6 blue
1 part = 6 ÷ 2 = 3
red: 3 × 3 = 9
Answer: 9

3 Standard form calculations

Work out $(13.6 \times 10^8) \div (8 \times 10^5)$
Give your answer in standard form.

Divide the numbers: 13.6 ÷ 8 = 1.7
Subtract the powers: 8 − 5 = 3
1.7×10^3
Answer: 1.7×10^3

4 Stem and leaf diagrams

The stem and leaf diagram shows 11 values.
(a) Find the median.
(b) Work out the range.

(a) 11 values, so the median is the 6th value
Reading in order: 12, 15, 16, 18, 19, 22, 26, 27, 32, 34, 36
Median = 22
(b) Range = 36 − 12 = 24
Answer: (a) 22 (b) 24

5 Significant figures

Work out the value of this expression. (Calculator)

$$\frac{8.2^3}{7.5}$$

Give your answer correct to 4 significant figures.

Use a calculator: the full display is 73.515733...
Round to 4 significant figures: 73.52
Answer: 73.52

6 Harder linear equations

Solve 6(x + 6) = 3(x + 10)

Expand the brackets: 6x + 36 = 3x + 30
Subtract 3x from both sides: 3x + 36 = 30
Subtract 36 from both sides: 3x = −6
Divide both sides by 3
Answer: x = −2

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7 Ordering standard form

Write these numbers in order of size.
Start with the smallest.
8.5×10^6, 3.3×10^{-5}, 6.8×10^0, 0.081

Write each in standard form: 8.5×10^6, 3.3×10^{-5}, 6.8×10^0, 8.1×10^{-2}
Compare the powers of 10 first (the bigger the power, the bigger the number)
Order: 3.3×10^{-5}, 0.081, 6.8×10^0, 8.5×10^6
Answer: 3.3×10^{-5}, 0.081, 6.8×10^0, 8.5×10^6

8 Solving quadratic equations

Solve $x^2 + 9x = 0$

Factorise: $x(x + 9) = 0$
Either $x = 0$ or $x + 9 = 0$
Answer: $x = -9$ or $x = 0$

9 Volume of cones and pyramids

A cone has base radius 3 m and vertical height 12 m.

Volume of a cone = $\frac{1}{3}\pi r^2 h$

Work out the volume of the cone.
Give your answer in terms of π.

Volume = $\frac{1}{3} \times \pi \times 3^2 \times 12$

$= \frac{1}{3} \times \pi \times 9 \times 12 = 36\pi$

Answer: 36π m^3

10 Currency conversion

£1 = 1.25 dollars
(a) Change £40 into dollars.
(b) Change $187.50 into pounds.

(a) $40 \times 1.25 = 50$
(b) Divide by the rate: $187.5 \div 1.25 = 150$
Answer: (a) $50 (b) £150