Day 161 **B Tier 10-a-day: Model Solutions**

1 Angles in triangles

Triangle XYZ is isosceles with XY = XZ.
Angle YXZ = 70°.
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 − 70 = 110
110 ÷ 2 = 55
Answer: 55°

2 Multiplying and dividing

Work out 475 × 35

Split 35 into 30 + 5
475 × 30 = 14,250
475 × 5 = 2375
14,250 + 2375 = 16,625
Answer: 16,625

3 Factorising

Factorise 2x + 4

The highest common factor of 2 and 4 is 2
Divide each term by 2: x + 2
Answer: 2(x + 2)

4 Venn diagram problems

30 students were asked.
8 of them play football and 16 of them play tennis.
2 of them did both.
(a) How many did neither?
(b) One is chosen at random. Find the probability that they play football but do not play tennis.

(a) Union = 8 + 16 − 2 = 22
Neither = 30 − 22 = 8
(b) Only play football = 8 − 2 = 6
P = 6 out of 30
Answer: (a) 8 (b) $\frac{1}{5}$

5 Real-life graphs

A printing company charges a set-up fee plus a cost for each box of leaflets.
The graph shows the total cost.
(a) Write down the fixed charge.
(b) Work out the cost for each box.

(a) The fixed charge is the cost when nothing has been used, where the line meets the vertical axis
(b) Take two points on the line, for example (0, 2) and (6, 26)
Cost for each box = (26 − 2) ÷ 6 = 4
Answer: (a) £2 (b) £4

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6 Standard form

Write each number as an ordinary number.

(a) 1.3×10^6

(b) 9.3×10^{-3}

(a) Multiply by 10, 6 times: move the decimal point 6 places right

$1.3 \times 10^6 = 1{,}300{,}000$

(b) $10^{-3} = 0.001$, so move the decimal point 3 places left

$9.3 \times 10^{-3} = 0.0093$

Answer: (a) 1,300,000 (b) 0.0093

7 Algebraic fractions

Write as a single fraction

$\frac{x}{3} + \frac{x}{4}$

Common denominator: 12

$\frac{4x}{12} + \frac{3x}{12}$

$\frac{7x}{12}$

Answer: $\frac{7x}{12}$

8 Tree diagrams

A bag contains 5 black socks and 7 white socks.

Liam takes one at random, replaces it, then takes a second.

Work out the probability that the two are the same colour.

P(both black) = $\frac{25}{144}$

P(both white) = $\frac{49}{144}$

Add: $\frac{25}{144} + \frac{49}{144} = \frac{37}{72}$

Answer: $\frac{37}{72}$

9 Area of an isosceles trapezium

An isosceles trapezium has parallel sides of length 28 cm and 4 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 $28 - 4 = 24$, so each end sticks out 12

$h^2 = 13^2 - 12^2 = 169 - 144 = 25$, so $h = 5$

(b) Area = ½ × (28 + 4) × 5 = 80

Answer: (a) 5 cm (b) 80 cm^2

10 Reverse repeated percentages

In a sale, the price of a sofa is reduced by 40%. (Calculator)

Two weeks later it is reduced by a further 25% of the new price.

The final price is £360.

Work out the original price of the sofa.

Multipliers: 0.6 and 0.75

Overall multiplier = 0.6 × 0.75 = 0.45

Original price = £360 ÷ 0.45 = £800

Answer: £800