Day 38 **B Tier 10-a-day: Model Solutions**

1 Bar charts

The bar chart shows some information.
(a) How many more were there for Banana than for Pear?
(b) Work out the total of all five bars.

(a) Banana: 30, Pear: 25
30 − 25 = 5
(b) 10 + 30 + 20 + 5 + 25 = 90
Answer: (a) 5 (b) 90

2 Solving equations

Solve $8a + 10 = -46$

Subtract 10 from both sides: $8a = -56$
Divide both sides by 8
Answer: $a = -7$

3 Comparing fractions and percentages

Mohammed has $\frac{9}{10}$ of £90.

Leah has 15% of £200.
Who has more money? You must show your working.

Mohammed: 90 ÷ 10 × 9 = £81
Leah: 200 ÷ 100 × 15 = £30
£81 is more than £30, so Mohammed has more
Answer: Mohammed

4 Angles in parallel lines

In the diagram, EF is parallel to GH.
(a) Work out the size of angle x.
(b) Give a reason for your answer.
The diagram is not drawn accurately.

Angle x and the 110° angle are co-interior angles (C shape)
x = 180 − 110 = 70°
Co-interior angles add up to 180°
Answer: (a) x = 70° (b) Co-interior angles add up to 180°

5 Currency conversion

£1 = 1.2 dollars
(a) Change £120 into dollars.
(b) Change $72 into pounds.

(a) 120 × 1.2 = 144
(b) Divide by the rate: 72 ÷ 1.2 = 60
Answer: (a) $144 (b) £60

6 Compound shapes with semicircles

A shape is made from a rectangle and a semicircle. (Calculator)
The rectangle is 16 cm wide and 20 cm high.
The diameter of the semicircle is 16 cm.
(a) Work out the area of the shape.
(b) Work out the perimeter of the shape.
Give each answer correct to 1 decimal place.

(a) Rectangle: $16 \times 20 = 320$

Semicircle: $\frac{1}{2} \times \pi \times 8^2 = 100.531...$

Total = $420.5\ cm^2$

(b) Curved edge: $\frac{1}{2} \times \pi \times 16 = 25.133...$

Straight edges: $16 + 20 + 20 = 56$

Total = 81.1 cm

Answer: (a) 420.5 cm^2 (b) 81.1 cm

7 Compound percentages

Ravi invests £5000 in a savings account. (Calculator)
The account pays 3% compound interest per year.
Work out the amount in the account after 2 years.
Give your answer to the nearest penny.

Multiplier = 1 + 3% = 1.03

Amount = 5000×1.03^2

= £5304.50

Answer: £5304.50

8 Disproving statements

Ali says, "The value of $n^2 + 5n + 11$ is a prime number for every positive whole number n."
Show that Ali is wrong.

Try n = 1, 2, 3, ... and check each answer

When n = 2: $2^2 + 5 \times 2 + 11 = 25$

25 is not prime because it has other factors

Answer: n = 2 gives 25, which is not prime

9 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 50% of the new price.
The final price is £25.
Work out the original price of the sofa.

Multipliers: 0.5 and 0.5

Overall multiplier = $0.5 \times 0.5 = 0.25$

Original price = £25 ÷ 0.25 = £100

Answer: £100

10 Gradient of a line

Work out the gradient of the straight line that passes through the points $(-1, -3)$ and $(-6, 7)$.

Gradient = $\frac{\text{change in y}}{\text{change in x}}$

Change in y = $7 - (-3) = 10$

Change in x = $-6 - (-1) = -5$

Gradient = $\frac{10}{-5} = -2$

Answer: -2