Day 141 **B Tier 10-a-day: Model Solutions**

1 Money

Priya buys 5 sandwiches at £2.35 each and 4 magazines at 85p each.
She pays with a £20 note.
Work out how much change she gets.

5 × £2.35 = £11.75
4 × 85p = £3.40
Total = £11.75 + £3.40 = £15.15
Change = £20 − £15.15 = £4.85
Answer: £4.85

2 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: 21, 22, 26, 32, 33, 37, 41, 42, 45, 46, 48
Median = 37
(b) Range = 48 − 21 = 27
Answer: (a) 37 (b) 27

3 Compound areas

A rectangular wall measures 11 m by 9 m.
A rectangle measuring 4 m by 2 m is cut out.
Work out the area that is left.

Whole area = 11 × 9 = 99
Area cut out = 4 × 2 = 8
99 − 8 = 91
Answer: 91 m^2

4 Exchange rates

The exchange rate is £1 = $1.35. (Calculator)
(a) Change £350 to dollars.
(b) Change $243 to pounds (£).

(a) Multiply by 1.35: 350 × 1.35 = $472.5
(b) Divide by 1.35: 243 ÷ 1.35 = £180
Answer: (a) $472.5 (b) £180

5 Function notation

$g(x) = 4x^2 + 6$
(a) Work out g(3)
(b) Work out g(−2)

(a) $g(3) = 4 \times 3^2 + 6 = 42$
(b) $g(-2) = 4 \times (-2)^2 + 6 = 22$
Answer: (a) 42 (b) 22

6 Congruent triangles

Triangle ABC has sides of 6 mm and 10 mm, and an angle of 55° that is not between them.
Triangle XYZ has sides of 6 mm and 10 mm, and an angle of 55° between them.
Are the two triangles congruent?
Give a reason for your answer.

In triangle ABC the angle is not between the two sides, in triangle XYZ it is
Two sides and a non-included angle do not prove congruence
Answer: No, the equal angle is in a different position

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7 Grouped frequency tables

The table shows the lengths of some leaves.
(a) Write down the modal class.
(b) Work out an estimate for the mean.

(a) The highest frequency is 11
(b) Use the midpoint of each class: 20, 40, 60, 80, 100
Sum of midpoint × frequency = 20 × 7 + 40 × 5 + 60 × 4 + 80 × 3 + 100 × 11 = 1920
Total frequency = 30
Estimate = 1920 ÷ 30 = 64
Answer: (a) 90 < l ≤ 110 (b) 64

8 Bounds

The length of a rectangle is 20 cm and its width is 29 cm.
Both measurements are correct to the nearest cm.
Work out the lower bound for the area of the rectangle.

Lower bound of each side = value − 0.5: 19.5 cm and 28.5 cm
Area = 19.5 × 28.5 = 555.75 cm^2
Answer: 555.75 cm^2

9 Simultaneous equations

Solve the simultaneous equations
3x + 4y = 20
3x + 2y = 16

Multiply the second equation by 2: 6x + 4y = 32
The y terms have the same sign, so subtract the first equation from the second: 3x = 12
x = 4
Substitute x = 4 into the first equation: 4y = 20 − 12 = 8
y = 2
Answer: x = 4, y = 2

10 Trigonometry in isosceles triangles

Triangle ABC is isosceles with AB = AC = 11 m. (Calculator)
The base BC = 6 m.
Work out the size of angle ABC.
Give your answer correct to 1 decimal place.

Split the triangle into two right-angled triangles. Half the base = 6 ÷ 2 = 3
$\cos B = \frac{3}{11}$
Angle ABC = $\cos^{-1}(\frac{3}{11})$ = 74.173...
= 74.2° (1 d.p.)
Answer: 74.2°