Day 282 **B Tier 10-a-day: Model Solutions**

1 Place value

Here are four digit cards.
7 8 3 4
Use all four cards to make the largest possible even number.

The last digit must be even. Put the biggest remaining digits first.
The largest even number is 8734
Answer: 8734

2 Symmetry

(a) Write down the number of lines of symmetry of an isosceles triangle.
(b) Write down the order of rotational symmetry of an isosceles triangle.

An isosceles triangle has 1 line of symmetry
An isosceles triangle only looks the same after a full turn, so the order is 1
Answer: (a) 1 (b) 1

3 Ratio to fraction and percentage

The ratio of cats to dogs at a vets is 7 : 5.
What fraction of them are cats?

Total parts = 7 + 5 = 12
cats are 7 out of 12 parts
Answer: $\frac{7}{12}$

4 Perimeter and area of compound shapes

The diagram shows the shape of a garden.
All the corners are right angles. All lengths are in cm.
(a) Find the perimeter.
(b) Find the area.

(a) Missing lengths: 14 − 9 = 5 and 15 − 12 = 3
Perimeter = 14 + 12 + 5 + 3 + 9 + 15 = 58
(b) Split into two rectangles: 14 × 12 = 168 and 9 × 3 = 27
168 + 27 = 195
Answer: (a) 58 cm (b) 195 cm^2

5 Scatter graphs

The scatter graph shows information about hours revising and test mark.
A line of best fit is drawn.
(a) Describe the correlation.
(b) Use the line of best fit to estimate the test mark when hours revising is 4.

(a) As one variable goes up, the other goes up
This is positive correlation
(b) Go up from 4 on the horizontal axis to the line, then across to the vertical axis
The reading is about 58
Answer: (a) Positive correlation (b) about 58

6 Factors and multiples

Write down all the common factors of 20 and 50.

Factors of 20: 1, 2, 4, 5, 10, 20
Factors of 50: 1, 2, 5, 10, 25, 50
The common factors are the numbers in both lists
Answer: 1, 2, 5, 10

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7 Two-way tables

The table shows some information about 62 people at a meeting.
One person from the group "Female" is chosen at random.
Find the probability that this person chose "Tea".

Female total = 62 − 32 = 30
Female who chose Tea = 30 − 6 = 24
P = 24 out of 30

Answer: $\frac{4}{5}$

8 Simultaneous equations problem

A shop sells pens and pencils. All pens cost the same and all pencils cost the same.
3 pens and 2 pencils cost 365p.
4 pens and 2 pencils cost 460p.
Work out the cost of one pen and the cost of one pencil.

Let a = cost of one pen and b = cost of one pencil
3a + 2b = 365 and 4a + 2b = 460
Subtract: 1a = 460 − 365 = 95, so a = 95
Substitute: 3 × 95 + 2b = 365, so 2b = 80 and b = 40
Answer: One pen costs 95p and one pencil costs 40p

9 Similar shapes

The two triangles are similar.
(a) Work out the scale factor of the enlargement from the smaller triangle to the larger triangle.
(b) Work out the value of p.
The diagram is not drawn accurately.

(a) Scale factor = 32 ÷ 8 = 4
(b) p is on the smaller triangle, so divide: 48 ÷ 4 = 12
Answer: (a) 4 (b) p = 12 m

10 Iteration

Here is an iteration formula.

$x_{n+1} = 6 + \frac{6}{x_n}$

$x_0 = 2$
(a) Work out x_1
(b) Work out x_2. Give your answer correct to 3 decimal places. (Calculator)

(a) $x_1 = 6 + \frac{6}{2} = 6 + 3 = 9$

(b) $x_2 = 6 + \frac{6}{9} = 6.66667...$

= 6.667
Answer: (a) 9 (b) 6.667