Day 301 **B Tier 10-a-day: Model Solutions**

1 Exterior angles of polygons

Each exterior angle of a regular polygon is 60°.
Work out the number of sides of the polygon.

Exterior angles add up to 360°
Number of sides = 360 ÷ 60 = 6
Answer: 6 sides

2 Continuing sequences

Here are the first four terms of a sequence.
5, 6, 11, 17
(a) Write down the next two terms.
(b) Describe the rule for continuing the sequence.

Each term is the sum of the two terms before it: 5 + 6 = 11
11 + 17 = 28 and 17 + 28 = 45
Answer: (a) 28, 45 (b) Add the two previous terms

3 Mixed numbers

Work out $3\frac{1}{5} - 1\frac{1}{2}$

Give your answer as a mixed number.

Write as improper fractions: $\frac{16}{5} - \frac{3}{2}$

Common denominator 10: $\frac{32}{10} - \frac{15}{10} = \frac{17}{10}$

As a mixed number: $1\frac{7}{10}$

Answer: $1\frac{7}{10}$

4 Area of 2D shapes

This is a triangle.
Find the area of the triangle.
The diagram is not drawn accurately.

Area of a triangle = ½ × base × height
½ × 10 × 7 = 35
Answer: 35 m^2

5 Real-life graphs

A company hires out bikes. There is a fixed charge plus a cost for each hour.
The graph shows the total cost.
(a) Write down the fixed charge.
(b) Work out the cost for each hour.

(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, 6) and (6, 24)
Cost for each hour = (24 − 6) ÷ 6 = 3
Answer: (a) £6 (b) £3

6 Ordering standard form

Write these numbers in order of size.
Start with the smallest.
3×10^2, 34,000, 9.8×10^{-5}, 170,000

Write each in standard form: 3×10^2, 3.4×10^4, 9.8×10^{-5}, 1.7×10^5
Compare the powers of 10 first (the bigger the power, the bigger the number)
Order: 9.8×10^{-5}, 3×10^2, 34,000, 170,000
Answer: 9.8×10^{-5}, 3×10^2, 34,000, 170,000

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7 Where a line crosses the axes

A straight line has equation $y = 5x - 10$

(a) Write down the coordinates of the point where the line crosses the y-axis.

(b) Work out the coordinates of the point where the line crosses the x-axis.

(a) When $x = 0$, $y = -10$

(b) The line crosses the x-axis when $y = 0$: $5x - 10 = 0$

$5x = 10$

$x = 2$

Answer: (a) (0, −10) (b) (2, 0)

8 Population density

City E has a population of 15,000.

Its area is 30 km^2.

Work out the population density.

Give your answer in people per km^2.

Population density = population ÷ area

15,000 ÷ 30 = 500

Answer: 500 people per km^2

9 Arc length and sector area

The diagram shows a sector of a circle with radius 3 cm and angle 120°. (Calculator)

Work out the length of the arc of the sector.

Give your answer correct to 1 decimal place.

The diagram is not drawn accurately.

Arc length = $\frac{120}{360} \times 2 \times \pi \times 3$

= 6.283... = 6.3 cm (1 d.p.)

Answer: 6.3 cm

10 Mean

Here are the heights of some plants.

11, 20, 19, 14, 17, 15

Work out the mean.

Add the values: 11 + 20 + 19 + 14 + 17 + 15 = 96

Divide by the number of values: 96 ÷ 6 = 16

Answer: 16 cm