Day 303 **B Tier 10-a-day: Model Solutions**

1 Ordering decimals

Write these numbers in order of size.
Start with the smallest number.
2.61, 2.7, 2.79, 2.763

Write each number to 3 decimal places:
2.610, 2.700, 2.790, 2.763
Now put them in order: 2.610, 2.700, 2.763, 2.790
Answer: 2.61, 2.7, 2.763, 2.79

2 Interior angles of regular polygons

A regular polygon has 15 sides.
(a) Work out the size of one exterior angle.
(b) Work out the size of one interior angle.

(a) Exterior angles add up to 360°, so 360 ÷ 15 = 24°
(b) Interior angle = 180 − 24 = 156°
Answer: (a) 24° (b) 156°

3 Solving equations

Solve p − 19 = 1

Add 19 to both sides
Answer: p = 20

4 Mode and median from a table

The table shows the goals scored in each match by a team.
(a) Write down the mode.
(b) Work out the median.

(a) The highest frequency is 10, for 5
(b) Total frequency = 35, so the median is the number 18 value
Running totals of frequency: 8, 10, 13, 16, 25, 35
The median is 4
Answer: (a) 5 (b) 4

5 Multiplying and dividing

Work out 181 × 16

Split 16 into 10 + 6
181 × 10 = 1810
181 × 6 = 1086
1810 + 1086 = 2896
Answer: 2896

6 Independent events

The probability that Amy is late for school on any day is 0.3.
The probability that Ben is late on any day is 0.8.
Whether each is late is independent of the other.
Work out the probability that at least one of them is late on Monday.

P(neither late) = (1 − 0.3) × (1 − 0.8) = 0.7 × 0.2 = 0.14
P(at least one late) = 1 − 0.14 = 0.86
Answer: 0.86

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7 Ordering standard form

Write these numbers in order of size.
Start with the smallest.
8.7×10^0, 0.006, 6.7×10^{-2}, 9.4×10^6

Write each in standard form: 8.7×10^0, 6×10^{-3}, 6.7×10^{-2}, 9.4×10^6
Compare the powers of 10 first (the bigger the power, the bigger the number)
Order: 0.006, 6.7×10^{-2}, 8.7×10^0, 9.4×10^6
Answer: 0.006, 6.7×10^{-2}, 8.7×10^0, 9.4×10^6

8 Simultaneous equations

Solve the simultaneous equations
$x + 2y = 11$
$2x + y = 7$

Multiply the second equation by 2: $4x + 2y = 14$
The y terms have the same sign, so subtract the first equation from the second: $3x = 3$
$x = 1$
Substitute $x = 1$ into the first equation: $2y = 11 - 1 = 10$
$y = 5$
Answer: $x = 1$, $y = 5$

9 Trigonometry: finding a side

Work out the length of x. (Calculator)
Give your answer correct to 1 decimal place.
The diagram is not drawn accurately.

Label the sides: x is the adjacent and 16 cm is the opposite
We use tan (opposite and adjacent)

$\tan 39° = \frac{16}{x}$

$x = \frac{16}{\tan 39°} = 19.758...$

x = 19.8 cm (1 d.p.)
Answer: x = 19.8 cm

10 Isosceles triangles and Pythagoras

Triangle ABC is isosceles with AB = AC = 5 cm.
The base BC = 8 cm.
(a) Work out the perpendicular height of the triangle.
(b) Work out the area of the triangle.

(a) The height splits the base in half: $8 \div 2 = 4$
$h^2 = 5^2 - 4^2 = 25 - 16 = 9$, so $h = 3$
(b) Area = $\frac{1}{2} \times 8 \times 3 = 12$
Answer: (a) 3 cm (b) 12 cm^2