Day 191 **B Tier 10-a-day: Model Solutions**

1 Metric units

A jug holds 2.4 litres of juice.
Each glass holds 300 ml.
How many glasses can be filled from the jug?

2.4 litres = 2.4 × 1000 = 2400 ml
2400 ÷ 300 = 8
Answer: 8 glasses

2 Ratio with a difference

Callum and Femi share some money in the ratio 9 : 1.
Callum gets £80 more than Femi.
How much money does Callum get?

Difference in parts: 9 − 1 = 8
8 parts = £80, so 1 part = £10
Callum gets 9 × £10 = £90
Answer: £90

3 Substitution with negative numbers

Work out the value of 4a − 2b
when a = −3 and b = 7

Substitute: 4 × (−3) − 2 × 7
−12 − 14 = −26
Answer: −26

4 Bearings

The bearing of B from A is 114°.
Work out the bearing of A from B.

114 is less than 180, so add 180°
114 + 180 = 294
Answer: 294°

5 Two-way tables

The table shows some information about 75 people at a meeting.
One person from the group "Female" is chosen at random.
Find the probability that this person chose "Tea".

Female total = 75 − 38 = 37
Female who chose Tea = 37 − 13 = 24
P = 24 out of 37
Answer: $\frac{24}{37}$

6 Using a given calculation

Use the fact that 26 × 39 = 1014
to work out
(a) 2600 × 39
(b) 10.14 ÷ 26

(a) 2600 = 26 × 100 and 39 is unchanged
So the answer is 1014 × 100 = 101,400
(b) 10.14 = 1014 ÷ 100 and 26 is unchanged
1014 ÷ 26 = 39, so the answer is 39 ÷ 100 = 0.39
Answer: (a) 101,400 (b) 0.39

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7 Equation of a line

A straight line has gradient −3 and passes through the point (3, 3).
Find the equation of the line.

The equation is $y = -3x + c$
Substitute $x = 3$ and $y = 3$: $3 = -3 \times 3 + c$
$3 = -9 + c$
$c = 3 - (-9) = 12$
Answer: $y = -3x + 12$

8 Venn diagram problems

24 adults were asked.
16 of them like tea and 12 of them like coffee.
9 of them did both.
(a) How many did neither?
(b) One is chosen at random. Find the probability that they like tea but do not like coffee.

(a) Union = 16 + 12 − 9 = 19
Neither = 24 − 19 = 5
(b) Only like tea = 16 − 9 = 7
P = 7 out of 24
Answer: (a) 5 (b) $\frac{7}{24}$

9 Radius from area or circumference

The circumference of a circle is 20π m.
Work out the radius of the circle.

Circumference = $2\pi r$, so $2r = 20$
$r = 20 \div 2 = 10$
Answer: 10 m

10 Simultaneous equations

Solve the simultaneous equations
$2x + y = 13$
$4x - y = 23$

The y terms have opposite signs, so add the equations: $6x = 36$
$x = 6$
Substitute $x = 6$ into the first equation: $y = 13 - 12 = 1$
$y = 1$
Answer: $x = 6, y = 1$