**Day 190** **B Tier 10-a-day: Model Solutions**

## 1 Angles on a line and round a point

The diagram shows 2 angles on a straight line.
Work out the value of n.
The diagram is not drawn accurately.

Angles on a straight line add up to 180°
(n + 29) + 115 = 180
n + 144 = 180
n = 36
**Answer: n = 36°**

## 2 Counting outcomes

Zain has 6 shirts, 5 pairs of trousers and 4 jumpers.
An outfit is one shirt, one pair of trousers and one jumper.
How many different outfits can be made?

6 × 5 × 4 = 120
**Answer: 120**

## 3 Perimeter and area of compound shapes

The diagram shows the shape of a kitchen floor.
All the corners are right angles. All lengths are in m.
(a) Calculate the perimeter.
(b) Calculate the area.

(a) Missing lengths: 13 − 9 = 4 and 15 − 8 = 7
Perimeter = 13 + 8 + 4 + 7 + 9 + 15 = 56
(b) Split into two rectangles: 13 × 8 = 104 and 9 × 7 = 63
104 + 63 = 167
**Answer: (a) 56 m (b) 167 $m^2$**

## 4 Using a given calculation

Use the fact that 48 × 19 = 912
to work out
(a) 4800 × 19
(b) 9.12 ÷ 4.8

(a) 4800 = 48 × 100 and 19 is unchanged
So the answer is 912 × 100 = 91,200
(b) 9.12 = 912 ÷ 100 and 4.8 = 48 ÷ 10
912 ÷ 48 = 19, so the answer is 19 ÷ 10 = 1.9
**Answer: (a) 91,200 (b) 1.9**

## 5 Missing value from a mean

The mean of 5 numbers is 8.
Four of the numbers are 2, 2, 10, 13.
Work out the other number.

Total of all 5 numbers = 5 × 8 = 40
Total of those given = 27
Missing number = 40 − 27 = 13
**Answer: 13**

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## 6 Fractions and decimals

(a) Write $\frac{9}{25}$ as a decimal.

(b) Write $\frac{7}{11}$ as a recurring decimal.

For part (b), write down the first 8 decimal places and say which digits repeat.

(a) 9 ÷ 25 = 0.36
(b) 7 ÷ 11: use short division, adding zeros
7 ÷ 11 = 0.63636363...
The digits 63 repeat
**Answer: (a) 0.36 (b) 0.63636363... (63 repeats)**

## 7 Speed unit conversion

A cyclist travels at 27 km/h.
Work out its speed in metres per second.

27 km = 27,000 m
1 hour = 3600 seconds
27,000 ÷ 3600 = 7.5 m/s
**Answer: 7.5 m/s**

## 8 Volume of a cylinder

A drum has radius 4 m and height 4 m.
Work out its volume.
Give your answer in terms of π.

Volume = π × radius$^2$ × height
π × $4^2$ × 4 = π × 16 × 4
= 64π
**Answer: 64π m$^3$**

## 9 Simultaneous equations

Solve the simultaneous equations
2x + 3y = −10
3x − 3y = 0

The y terms have opposite signs, so add the equations: 5x = −10
x = −2
Substitute x = −2 into the first equation: 3y = −10 − (−4) = −6
y = −2
**Answer: x = −2, y = −2**

## 10 Equations with fractional answers

Solve 9x + 6 = 18
Give your answer as a fraction in its simplest form.

Subtract 6 from both sides: 9x = 12

Divide both sides by 9: x = $\frac{12}{9}$

Simplify the fraction

**Answer: x = $\frac{4}{3}$**