**Day 115** **B Tier 10-a-day: Model Solutions**

## 1 Negative numbers

The temperature on a mountain at 6 am is −5°C.
(a) The temperature rises by 7°C. Work out the new temperature.
(b) The highest temperature one day was 7°C and the lowest was −8°C. Work out the difference.

(a) −5 + 7 = 2
(b) Difference = 7 − (−8) = 7 + 8 = 15
**Answer: (a) 2°C (b) 15°C**

## 2 Simplifying ratios

Write the ratio £14 : 800p in its simplest form.

Change to pence: £14 = 1400p
1400 : 800
Divide both by 200 to get 7 : 4
**Answer: 7 : 4**

## 3 Substitution into formulae

Here is a formula.
T = 5n + 20
Work out the value of T when n = 13

T = 5 × 13 + 20
T = 85
**Answer: T = 85**

## 4 Metric units

A jug holds 1.75 litres of juice.
Each glass holds 125 ml.
How many glasses can be filled from the jug?

1.75 litres = 1.75 × 1000 = 1750 ml
1750 ÷ 125 = 14
**Answer: 14 glasses**

## 5 Surface area of cuboids

A gift box measures 10 cm by 6 cm by 3 cm.
Work out the total surface area.

Top and bottom: 2 × 10 × 6 = 120
Front and back: 2 × 10 × 3 = 60
Two sides: 2 × 6 × 3 = 36
120 + 60 + 36 = 216
**Answer: 216 cm$^2$**

## 6 Harder linear equations

Solve 6 − 4x = 2x − 24

Add 4x to both sides: 6 = 6x − 24
Add 24 to both sides: 30 = 6x
Divide both sides by 6
**Answer: x = 5**

## 7 Standard form calculations

A spacecraft travels at $4 \times 10^6$ km per hour.
It travels for $1.9 \times 10^3$ hours at this speed.
Work out how far it travels.
Give your answer in standard form.

Distance = speed × time
$(4 \times 10^6) \times (1.9 \times 10^3) = 7.6 \times 10^9$
**Answer: $7.6 \times 10^9$ km**

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## 8 Trigonometry: finding a side

Find 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 hypotenuse and 5 cm is the opposite
We use sin (opposite and hypotenuse)

$\sin 65° = \frac{5}{x}$

$x = \frac{5}{\sin 65°} = 5.517...$

x = 5.5 cm (1 d.p.)

**Answer: x = 5.5 cm**

## 9 Independent events

The probability that it rains on Saturday is 0.1.
The probability that it rains on Sunday is 0.3.
The events are independent.
Work out the probability that it rains on both days.

P(both) = P(Saturday) × P(Sunday)
0.1 × 0.3 = 0.03

**Answer: 0.03**

## 10 Area of 2D shapes

The diagram shows a trapezium.
Find the area of the trapezium.
The diagram is not drawn accurately.

Area of a trapezium = ½ × (a + b) × h
½ × (11 + 5) × 10 = ½ × 16 × 10
= 80

**Answer: 80 $m^2$**