Day 277 **B Tier 10-a-day: Model Solutions**

1 Solving inequalities

Solve $\frac{y}{4} + 2 > 7$

Subtract 2 from both sides: $\frac{y}{4} > 5$

Multiply both sides by 4

Answer: y > 20

2 Angles in triangles

A right-angled triangle has one angle of 23°.
Work out the size of the other acute angle.

Angles in a triangle add up to 180°

180 − 90 − 23 = 67

Answer: 67°

3 Fuel use

A car uses 20 litres of petrol to travel 360 km.
Work out how many kilometres it travels on each litre of petrol.

360 ÷ 20 = 18

Answer: 18 km per litre

4 Circumference and area of a circle

The diagram shows a circle with diameter 29 cm. (Calculator)
Work out the area of the circle.
Give your answer correct to 1 decimal place.
The diagram is not drawn accurately.

Area = π × radius^2

Radius = 29 ÷ 2 = 14.5

π × 14.5^2 = 660.520...

= 660.5 cm^2 (1 d.p.)

Answer: 660.5 cm^2

5 Standard form calculations

A spacecraft travels at 9 × 10^4 km per hour.
It travels for 4.7 × 10^3 hours at this speed.
Work out how far it travels.
Give your answer in standard form.

Distance = speed × time

(9 × 10^4) × (4.7 × 10^3) = 42.3 × 10^7

In standard form: 4.23 × 10^8

Answer: 4.23 × 10^8 km

6 Bearings

The bearing of B from A is due south.
(a) Write down the bearing of B from A.
(b) Work out the bearing of A from B.

(a) Bearings are measured clockwise from north: south is 180°

(b) The bearing is more than 180°, so subtract 180°: 180 − 180 = 0

Answer: (a) 180° (b) 000°

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7 Ratio with a difference

Aisha and Omar share some money in the ratio 9 : 8.
Aisha gets £15 more than Omar.
How much money does Aisha get?

Difference in parts: 9 − 8 = 1
1 parts = £15, so 1 part = £15
Aisha gets 9 × £15 = £135
Answer: £135

8 Solving quadratic equations

Solve $x^2 - 4x - 5 = 0$

Factorise: (x − 5)(x + 1) = 0
Either x − 5 = 0 or x + 1 = 0
Answer: x = −1 or x = 5

9 Time

(a) Write 1.5 hours in hours and minutes.
(b) Write 3 hours 15 minutes as a decimal number of hours.

(a) 0.5 hours = 0.5 × 60 = 30 minutes
(b) 15 ÷ 60 = 0.25 hours
Answer: (a) 1 hour 30 minutes (b) 3.25 hours

10 Cumulative frequency

The cumulative frequency graph shows the times taken by 40 students to complete a puzzle.
(a) Use the graph to estimate the median.
(b) Work out an estimate for the interquartile range.

(a) Median is at 40 ÷ 2 = 20: read across from 20 on the vertical axis to the curve, then down: 50
(b) Lower quartile at 10: 45. Upper quartile at 30: 76
IQR = 76 − 45 = 31
Answer: (a) 50 minutes (b) 31 minutes