Day 270 **B Tier 10-a-day: Model Solutions**

1 Angles in triangles

A right-angled triangle has one angle of 63°.
Work out the size of the other acute angle.

Angles in a triangle add up to 180°
180 − 90 − 63 = 27
Answer: 27°

2 Bar charts

The bar chart shows some information.
(a) How many more were there for Mon than for Fri?
(b) Work out the total of all five bars.

(a) Mon: 20, Fri: 5
20 − 5 = 15
(b) 20 + 15 + 25 + 10 + 5 = 75
Answer: (a) 15 (b) 75

3 Wages and overtime

Dev is paid £14.50 per hour for a 30 hour week. (Calculator)
Overtime is paid at double time.
In one week he works 7 hours of overtime.
Work out his total pay for that week.

Normal pay: 30 × £14.50 = £435
Overtime rate: £14.50 × 2 = £29 per hour
Overtime pay: 7 × £29 = £203
Total: £435 + £203 = £638
Answer: £638

4 Map scales

The scale of a map is 1 : 50,000.
Two towns are 16 cm apart on the map.
Work out the real distance between the towns.
Give your answer in kilometres.

16 × 50,000 = 800,000 cm
100 000 cm = 1 km, so divide by 100 000
= 8 km
Answer: 8 km

5 Gradient and intercept

A straight line has equation y = 8x + 1
(a) Write down the gradient of the line.
(b) Write down the equation of a line that is parallel to this line and passes through the point (0, 2).

(a) The line is in the form y = mx + c, so the gradient m is the number in front of x
(b) Parallel lines have the same gradient, 8
It crosses the y-axis at 2, so c = 2
Answer: (a) 8 (b) y = 8x + 2

6 Percentage change

Tom bought a bike for £120 and sold it for £102.
Work out the percentage loss.

Loss = cost − selling price = £18

Percentage loss = $\frac{£18}{£120}$ × 100 = 15%

Answer: 15% loss

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7 Angles and algebra

The angles of a triangle are x°, 3x° and (3x + 19)°.
Work out the size of the largest angle.

Angles in a triangle add up to 180°
7x + 19 = 180
7x = 161, so x = 23
The angles are 23°, 69°, 88°
Answer: 88°

8 Trigonometry in context

Sam stands 72 m from the base of a tower on level ground. (Calculator)
The angle of elevation of the top of the tower is 48°.
Work out the height of the tower.
Give your answer correct to 1 decimal place.

The distance is the adjacent side and the height is the opposite side

$\tan 48° = \frac{h}{72}$

h = 72 × tan 48° = 79.964...
h = 80.0 m (1 d.p.)
Answer: 80.0 m

9 Distance, speed and time

A bus leaves at 10:45 am.
It travels 144 km at an average speed of 36 km/h.
At what time does it arrive?

Time = 144 ÷ 36 = 4 hours = 4 hours
10:45 am + 4 hours = 2:45 pm
Answer: 2:45 pm

10 Bounds

The length of a rectangle is 30 cm and its width is 10 cm.
Both measurements are correct to the nearest cm.
Work out the upper bound for the perimeter of the rectangle.

Upper bound of each side = value + 0.5: 30.5 cm and 10.5 cm
Perimeter = 2 × (30.5 + 10.5) = 82 cm
Answer: 82 cm