Day 338 **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 p.
The diagram is not drawn accurately.

Angles on a straight line add up to 180°
80 + (p + 86) = 180
p + 166 = 180
p = 14
Answer: p = 14°

2 Venn diagram problems

36 households were asked.
24 of them have a cat and 14 of them have a dog.
8 of them did both.
(a) How many did neither?
(b) One is chosen at random. Find the probability that they have a cat but do not have a dog.

(a) Union = 24 + 14 − 8 = 30
Neither = 36 − 30 = 6
(b) Only have a cat = 24 − 8 = 16
P = 16 out of 36
Answer: (a) 6 (b) $\frac{4}{9}$

3 Points on a line

Does the point (7, −8) lie on the line
y = −x − 3 ?
You must show your working.

Put x = 7 into the equation: y = −1 × 7 − 3 = −10
The y-coordinate of the point is −8, which is not −10
Answer: No, when x = 7 the line has y = −10

4 Distance, speed and time

A boat leaves at 8:15 am.
It travels 36 km at an average speed of 18 km/h.
At what time does it arrive?

Time = 36 ÷ 18 = 2 hours = 2 hours
8:15 am + 2 hours = 10:15 am
Answer: 10:15 am

5 Pythagoras' theorem

Calculate the length of p. (Calculator)
Give your answer correct to 1 decimal place.
The diagram is not drawn accurately.

Use Pythagoras: $a^2 + b^2 = c^2$, where c is the longest side
$p^2 + 7^2 = 10^2$
$p^2 = 100 - 49 = 51$
$p = \sqrt{51} = 7.141...$
p = 7.1 m (1 d.p.)
Answer: p = 7.1 m

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6 Percentage change

Zara bought a guitar for £400 and sold it for £160.
Work out the percentage loss.

Loss = cost − selling price = £240

Percentage loss = $\frac{£240}{£400} \times 100 = 60\%$

Answer: 60% loss

7 Radius from area or circumference

The area of a circle is 159 m^2. (Calculator)
Work out the radius of the circle.
Give your answer correct to 1 decimal place.

Area = πr^2, so $r^2 = 159 \div \pi = 50.611...$

$r = \sqrt{50.611} = 7.114...$

r = 7.1 m (1 d.p.)

Answer: 7.1 m

8 Solving quadratic equations

Solve $x^2 - 4x = 0$

Factorise: $x(x - 4) = 0$

Either $x = 0$ or $x - 4 = 0$

Answer: x = 0 or x = 4

9 Growth in standard form

There are 6.7×10^2 fish in a lake.
The number doubles every day.
How many are there after 3 days?
Give your answer in standard form.

Each day multiply by 2, so multiply by $2^3 = 8$

$6.7 \times 10^2 \times 8 = 53.6 \times 10^2$

In standard form: 5.36×10^3

Answer: 5.36×10^3

10 Reverse repeated percentages

In a sale, the price of a sofa is reduced by 20%. (Calculator)
Two weeks later it is reduced by a further 50% of the new price.
The final price is £80.
Work out the original price of the sofa.

Multipliers: 0.8 and 0.5

Overall multiplier = 0.8 × 0.5 = 0.4

Original price = £80 ÷ 0.4 = £200

Answer: £200