Day 149 **B Tier 10-a-day: Model Solutions**

1 Gradient of a line

Work out the gradient of the straight line that passes through the points $(-2, 8)$ and $(-5, 14)$.

Gradient $= \frac{\text{change in y}}{\text{change in x}}$

Change in y $= 14 - 8 = 6$

Change in x $= -5 - (-2) = -3$

Gradient $= \frac{6}{-3} = -2$

Answer: -2

2 Faces, edges and vertices

Write down the number of faces and vertices of a cylinder.
Count curved faces and curved edges as well.

Faces: 2 flat faces and 1 curved face = 3

Vertices: 0 (there are no corners)

Answer: faces: 3 vertices: 0

3 Cost formulae

A taxi firm charges £38 plus £15 for each mile travelled.
(a) Work out the total cost for 5 miles.
(b) The total cost is £143. Work out the number of miles.

(a) $15 \times 5 = 75$, then $38 + 75 = 113$

(b) Take off the fixed charge: $143 - 38 = 105$

Divide by the cost for each: $105 \div 15 = 7$

Answer: (a) £113 (b) 7

4 Inverse proportion

10 pumps take 12 minutes to empty a pool.
All the pumps work at the same rate.
How long would it take 2 pumps?

The total work stays the same: $10 \times 12 = 120$ pumps-minutes

With 2 pumps: $120 \div 2 = 60$ minutes

Answer: 60 minutes

5 Exchange rates

The exchange rate is £1 = €1.12. (Calculator)
(a) Change £40 to euros.
(b) Change €168 to pounds (£).

(a) Multiply by 1.12: $40 \times 1.12 = €44.8$

(b) Divide by 1.12: $168 \div 1.12 = £150$

Answer: (a) €44.8 (b) £150

6 Proving a triangle is right-angled

A triangle has sides of length 9 cm, 8 cm and 6 cm.
Is the triangle right-angled?
You must show your working.

The longest side is 9. Check whether $a^2 + b^2 = c^2$

$6^2 + 8^2 = 36 + 64 = 100$

$9^2 = 81$

These are not equal, so the triangle is not right-angled

Answer: No, $6^2 + 8^2 = 100$ but $9^2 = 81$

Day 149 **B Tier 10-a-day: Model Solutions**

7 Missing value from a mean

The mean of 4 numbers is 11.
3 of the numbers are 11, 10, 9.
Work out the other number.

Total of all 4 numbers = $4 \times 11 = 44$
Total of those given = 30
Missing number = $44 - 30 = 14$
Answer: 14

8 Growth in standard form

There are 6.3×10^3 fish in a lake.
The number triples every day.
How many are there after 6 days?
Give your answer in standard form.

Each day multiply by 3, so multiply by $3^6 = 729$
$6.3 \times 10^3 \times 729 = 4592.7 \times 10^3$
In standard form: 4.5927×10^6
Answer: 4.5927×10^6

9 Solving quadratic equations

Solve $x^2 - 7x + 6 = 0$

Factorise: $(x - 6)(x - 1) = 0$
Either $x - 6 = 0$ or $x - 1 = 0$
Answer: x = 1 or x = 6

10 Ordering decimals

Write these numbers in order of size.
Start with the smallest number.
0.39, 0.227, 0.22, 0.2

Write each number to 3 decimal places:
0.390, 0.227, 0.220, 0.200
Now put them in order: 0.200, 0.220, 0.227, 0.390
Answer: 0.2, 0.22, 0.227, 0.39