

A-Level Scenario-Based Math Questions (With Real-Life Stories)

Surds – Construction Scenario

A construction engineer is designing a square glass panel with an area of 98 m^2 for a modern building.

1. Express the exact length of one side in simplest surd form.
2. The diagonal support beam runs across the square. Find its exact length in surd form.

Indices – Radioactive Decay Scenario

A medical researcher studies a radioactive substance used in cancer treatment. The amount is modeled by $N = 800 \times 2^{-(t/4)}$.

3. Find how long it takes for the substance to reduce to 100 units.
4. Solve: $16^{(x+1)} = 2^{(3x+5)}$ and interpret the result in terms of decay rate.

Logarithms – Earthquake Measurement Scenario

An earthquake's magnitude is measured using the Richter scale: $M = \log_{10}(I/I_0)$.

5. If the intensity is 1000 times the base intensity, find the magnitude.
6. Solve: $\log_{10}(x - 2) + \log_{10}(x + 3) = 2$ and explain its physical meaning.

Coordinate Geometry – Drone Navigation Scenario

A drone travels between two checkpoints A(1, 3) and B(9, 15) during a delivery.

7. Find the distance the drone travels.
8. Determine the midpoint where the drone pauses.
9. Find the equation of the path taken by the drone.