



QUESTION WORKBOOK

Log graphs and exponential models

Exponentials and logarithms · Year 12

7 questions · 20 marks

NAVY SCREEN EDITION

SECTION A · Warm-up

- A1** A quantity is believed to follow a power law $y = ax^n$. State what should be plotted to test the claim, and what the gradient and intercept of the resulting line give.

[2]

- A2** A quantity is believed to follow exponential growth $y = ab^x$. State what should be plotted, and what the gradient and intercept give.

[2]

SECTION B · Standard

- B1** A quantity follows $y = ax^n$, and measurements give $(4, 40)$ and $(9, 135)$. Find n and a , and state the law.

[4]

- B2** A mass in grams is modelled by $m = 60e^{-0.1t}$, with t in days. State the initial mass, find the mass after 5 days, and find the half-life of the decay, each to 3 significant figures where rounding is needed. [3]

- B3** The model $y = 3 \times 5^x$ is to be drawn as a straight line. State what should be plotted, and give the line's gradient and intercept to 3 significant figures. [3]

SECTION C · Stretch

- C1** A log-log plot of some data gives a straight line with gradient 0.5 and intercept $\log 6$. Find the law connecting y and x , and the value of y when $x = 25$. [4]

- C2** For the decay model $m = 60e^{-0.1t}$, show that the ratio $m(t + 7)/m(t)$ is the same for every t , and find its value to 3 significant figures. [2]