



QUESTION WORKBOOK

Exponential functions and e

Exponentials and logarithms · Year 12

7 questions · 21 marks

NAVY SCREEN EDITION

SECTION A · Warm-up

- A1** For the curve $y = 3^x$, write down the y-intercept, the value of y at $x = 2$, and the equation of the asymptote. [3]

- A2** Explain why the equation $5^x = 0$ has no solution. [2]

SECTION B · Standard

- B1** For the curve $y = e^{4x}$, write down the gradient function, the gradient at $x = 0$, and the gradient at $x = 0.5$ to 3 significant figures. [3]

- B2** For the curve $y = e^{-2x}$, write down the gradient function and the value of y at $x = 1$, and describe the curve's behaviour as x grows. [3]

- B3** A population of bacteria triples every hour, starting from 500. Write down a model for the population P after t hours, and find the population after 4 hours. [3]

SECTION C · Stretch

- C1** For $y = 5e^{0.2x}$, show that the gradient at every point equals $0.2y$, and find the height and gradient at $x = 5$, each to 3 significant figures. [4]

- C2** The curves $y = 2^x$ and $y = 3^x$ have gradients of about 0.69 and 1.10 at their common point $(0, 1)$. Explain what this suggests about the number e , and state the defining property of $y = e^x$. [3]
