

Exponential and Logarithmic Functions

1. On the same diagram sketch the graphs of $y = 4^x$ and $y = \log_4 x$.
(the co-ordinates of 2 points should be indicated on each graph. (4)
2. Simplify:
a) $\log_5 125$ b) $\log_2 8 + \log_2 4$ c) $\log_a 12 + \log_a 3 - \log_a 4$
d) $2\log_3 9$ e) $4\log_4 2 - \log_4 8$ f) $4\log_4 \frac{1}{2}$ (13)
3. Solve $\log_2 (3x - 5) - \log_2 (x + 2) = 1$ for $x > 0$. (3)
4. Solve (to 3 decimal places)
a) $3^x = 7$ b) $e^{3x} = 45$ (6)
5. The number of bacteria in a petri dish is given by the formula $B(t) = 20e^{1.2t}$, where t is time in hours.
a) How many bacteria are there at time zero? (1)
b) How long will it take for the number of bacteria to triple? (3)
6. The number of bacteria of a particular strain is given by $B(t) = 40e^{1.5t}$, where t is the time in hours. How long will it take for the number of bacteria to double? (3)
7. The table below shows figures obtained from an experiment.

$\log_{10} x$	0.699	0.903	1.08	1.15	1.3
$\log_{10} y$	1.35	1.66	1.92	2.02	2.25

Assuming that $y = ax^b$ find approximate values for a and b .
(tricky!)

(7)

Revision

8. A curve for which $\frac{dy}{dx} = 3x^2 + 1$ passes through the point $(-1, 2)$. Express y in terms of x . (4)

44 Marks