



CHAPTER 5: INDICES AND LOGARITHMS



Paper 1

Solution to Question 5

$$\begin{aligned}3^{x+2} - 2(3^{x+1}) &= 3 \\3^x(3^2) - 2(3^x)(3) &= 3 \\3^x(9-6) &= 3 \\3^x &= 1 \\3^x &= 3^0 \\x &= 0\end{aligned}$$

Solution to Question 12

Given $\log_3 p = a$ and $\log_3 q = b$.

$$\begin{aligned}\text{(a)} \quad \log_{27} q &= \frac{\log_3 q}{\log_3 27} \\&= \frac{b}{\log_3 3^3} \\&= \frac{b}{3}\end{aligned}$$

$$\begin{aligned}\text{(b)} \quad \log_3 \frac{9\sqrt{p}}{q} &= \log_3 9 + \log_3 \sqrt{p} - \log_3 q \\&= \log_3 3^2 + \log_3 p^{\frac{1}{2}} - \log_3 q \\&= 2 + \frac{1}{2} \log_3 p - \log_3 q \\&= 2 + \frac{1}{2} a - b \\&= \frac{1}{2}(4 + a - 2b)\end{aligned}$$



Paper 1

1. Given that $\log_{10} pq = 2 + 3 \log_{10} p - \log_{10} q$, express p in terms of q .

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2. Solve the equation $4 + \log_2(x - 6) = \log_2 x$.

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3. Solve the equation $(3^{x+1})(5^{2x}) = 35$.

4. Solve the equation $64^{3x} = 16^{5+2x}$.

5. Given $\log_3 2 = 0.6309$ and $\log_3 5 = 1.465$. Without using a calculator, find the value of $\log_9 20$.

6. If $\log_x a^2 b = 7$ and $\log_x \frac{b^3}{a^2} = 5$, find the values of $\log_x a$ and $\log_x b$. If $x = 5$, find the values of a and b .