# Chapter Name : Logarithm

1) Solve the following equation for $x$ : $\log_6(x - 2) + \log_6(x + 3) = 1$.

2) Prove the following: $(\log x)^2 - (\log y)^2 = \log\frac{x}{y} \cdot \log xy$.

3) Evaluate the following: $\log 2 + 16 \log\frac{16}{15} + 12 \log\frac{25}{24} + 7 \log\frac{81}{80}$.

4) If $x^2 + y^2 = 23xy$, prove that $\log\left\{\frac{1}{5}(x + y)\right\} = \frac{1}{2}(\log x + \log y)$.

5) Find the value of $\dfrac{\log\sqrt{27} + \log\sqrt{8} - \log\sqrt{125}}{\log 6 - \log 5}$.

6) If $\log_3(x^2 + 2) = 3$, find $x$.

7) If $\log(m + n) = \log m + \log n$, show that $n = \dfrac{m}{m-1}$

8) If $\log\frac{x+y}{2} = \frac{1}{2}(\log x + \log y)$, prove that $x = y$.

9) Prove that $2\log\frac{11}{13} + \log\frac{130}{77} - \log\frac{55}{91} = \log 2$

10) If $\log(x + 1) + \log(x - 1) = 2\log 3 + \log 11$, find the value of $x$.

11) If $x = \log\frac{3}{5}$, $y = \log\frac{5}{4}$ and $z = 2\log\frac{\sqrt{3}}{2}$ find the values of $3^{x+y-z}$.