8.6 Logarithmic Equations

std. 11

- **If** $\log_b x = \log_b y$ **, then** $x = y$. $(x, y > 0)$

Examples

1 $\log_a x + \log_a (2x+3) = \log_a 2$

$\log_a x^{-2}$

$a^n = 2$

$\log_a (2x^2 + 3x) = \log_a 2$

$2x^2 + 3x = 2$

$x = -2, \frac{1}{2}$

2 $\frac{1}{3}\ln 8x - \ln 5 = \ln 4$

$\ln \sqrt[3]{8x} - \ln 5 = \ln 4$

$\ln \frac{2\sqrt[3]{x}}{5} = \ln 4$

$x = 1000$

$\frac{2\sqrt[3]{x}}{5} = 4$

3 $\log_4 \left(\frac{x}{2} \right) = 3$

$4^3 = \frac{x}{2}$

$128 = x$

$\log_4 \left(\frac{x}{2} \right) = \log_4 \frac{64}{?}$

4 $\ln \sqrt{x} - \ln 2 = 4$

$\ln \frac{\sqrt{x}}{2} = 4$

$\log_e \left(\frac{\sqrt{x}}{2} \right) = 4$

$e^4 = \frac{\sqrt{x}}{2}$

$\left(2e^4 \right)^2 = \left(\sqrt{x} \right)^2$

$4e^8 = x$