

Worksheet 12 – Exponential and Logarithmic Equations (§5.5)

1. Solve the following equations.

(a) $2^{4x} = 8$

(b) $5^{2x-1} = 125$

(c) $2^{x^3-x} = 1$

(d) $9 \cdot 3^{7x} = \left(\frac{1}{9}\right)^{2x}$

2. Solve the following equations.

(a) $3^{2x} = 5$

(b) $5^x = -2$

(c) $2500 = \frac{5000}{1+2e^{-3x}}$

(d) $25\left(\frac{4}{5}\right)^x = 10$

(e) $3^{x-1} = 2^x$

(f) $7^{3+7x} = 3^{4-2x}$

(g) $e^{2x} = e^x + 6$

(h) $3^x + 25 \cdot 3^{-x} = 10$

3. Solve the following equations.

(a) $\log_3(7 - 2x) = 2$

(b) $\log_{1/2}(2x - 1) = -3$

(c) $\ln(8 - x^2) = \ln(2 - x)$

(d) $\log_{125}\left(\frac{3x-2}{2x+3}\right) = \frac{1}{3}$

(e) $3 \ln(x) - 2 = 1 - \ln(x)$

(f) $\log_3(x - 4) + \log_3(x + 4) = 2$

(g) $\log_{169}(3x + 7) = \frac{1}{2} + \log_{169}(5x - 9)$

(h) $\log_5(2x + 1) = 1 - \log_5(x + 2)$

(i) $\ln(x + 1) - \ln(x) = 3$

(j) $[\log(x)]^2 = 2 \log(x) + 15$