Solving Exponential and Logarithmic Equations

1. Solve each exponential equation.

a. $6^{x-2} = 6^{3x-4}$

b. $8^{x-1} = \left(\frac{1}{4}\right)^{1-x}$

c. $5^{x-2} = \frac{1}{125^{x}}$

d. $4^{5-x} = 128$

e. $3^{x-1} = \left(\sqrt{3}\right)^{x+1}$

f. $125^{x-1} = \left(\frac{1}{5}\right)^{1-2x}$

g. $2^{3x-1} = 4^{x+2}$

h. $7^{2x+4} = \left(\frac{1}{49}\right)^{x-3}$

i. $8^{2x-2} = 4^{2-x}$

j. $10^{x} = 3.91$

k. $e^{x} = 5.7$

l. $5^{x} = 17$

m. $5e^{x} = 23$

n. $e^{1-5x} = 793$

o. $e^{5x-3} - 2 = 10{,}476$

p. $7^{x+2} = 410$

q. $3^{\frac{x}{7}} = .2$

r. $e^{4x} - 5e^{2x} - 24 = 0$

s. $e^{2x} - 2e^{x} - 3 = 0$

t. $e^{4x} + 5e^{2x} - 24 = 0$

u. $e^{4x} - 3e^{2x} - 18 = 0$

v. $3^{2x} + 3^{x} - 2 = 0$

w. $2^{2x} + 2^{x} - 12 = 0$

Solve each logarithmic equation.

b. $log_3 x = 4$

b. $log_x(x+4) = 3$

c. $log_3(x-4) = -3$

d. $log_5 x + log_5(4x-1) = 1$

e. $log_3(x-5) + log_3(x+3) = 2$

f. $log_2(x+2) - log_2(x-5) = 3$

g. $2log_3(x+4) = log_3 9 + 2$

h. $3log_2(x-1) = 5 - log_2 4$

i. $log_2(x-6) + log_2(x-4) - log_2 x = 2$

2. Solve equations involving natural logarithms.

a. $\ln x = 2$

b. $5\ln(2x) = 20$

c. $6 + 2\ln x = 5$

d. $\ln\sqrt{x+3} = 1$

e. $\ln(x+1) - \ln(x-2) = \ln x^2$

Solve by graphing each equation.

b. $log_2 x + log_2(x+5) = log_2(x+4)$

b. $\ln(x) + \ln(x^2+4) = 10$