

$$41. \log x + \log(x+4) = \log 12$$

$$\log x(x+4) = \log 12$$

$$x^2 + 4x = 12$$

$$x^2 + 4x - 12 = 0$$

$$(x+6)(x-2) = 0$$

$$x+6=0 \quad | \quad x-2=0$$

$$x = -6 \quad | \quad x = 2$$

$\log -6$
DNE

$$43. \log_4(x+3) + \log_4(x-3) = 2$$

$$\log_4(x+3)(x-3) = 2$$

$$(x+3)(x-3) = 4^2 = 16$$

$$x^2 - 9 = 16$$

$$x^2 - 25 = 0$$

$$(x+5)(x-5) = 0$$

$$x+5=0 \quad | \quad x-5=0$$

$$x = -5 \quad | \quad x = 5$$

$\log_4(-5+3)$
DNE

$$45. \log(2x+1) - \log(x-2) = 1$$

$$\log \frac{2x+1}{x-2} = 1$$

$$\frac{2x+1}{x-2} = 10^1 = 10$$

$$2x+1 = 10x-20$$

$$-8x = -21$$

$$x = \frac{21}{8}$$

$$47. \ln(x+8) + \ln(x-1) = 2 \ln x$$

$$\ln(x+8)(x-1) = \ln x^2$$

$$(x+8)(x-1) = x^2$$

$$x^2 + 7x - 8 = x^2$$

$$7x - 8 = 0$$

$$7x = 8$$

$$x = \frac{8}{7}$$