

You should ALWAYS check your answers when solving equations, but this becomes even more important when dealing with log equations since they have restricted domains.

Ex8) $\log(5x) + \log(x-1) = 2$

$$\log[5x(x-1)] = 2$$

$$10^2 = 5x^2 - 5x$$

$$0 = 5x^2 - 5x - 100$$

$$0 = 5(x^2 - x - 20)$$

$$0 = 5(x-5)(x+4)$$

$$x-5=0 \quad x+4=0$$

$$\boxed{x=5} \quad x=-4 \text{ extraneous}$$

Now You Try ©

10) $\log_4(3x-8) = 3$

$$4^3 = 3x-8$$

$$64 = 3x-8$$

$$72 = 3x$$

$$\boxed{24 = x}$$

12) $\log_{27} m = 4/3$

14) $\log_2 x + \log_2(x^2 - 9) = \log_2 16x$

16) $3^{x+3} = 2^x$

$$\log 3^{x+3} = \log 2^x$$

$$(x+3) \cdot \log 3 = x \log 2$$

$$x \log 3 + 3 \log 3 = x \log 2$$

$$3 \log 3 = x \log 2 - x \log 3$$

$$3 \log 3 = x(\log 2 - \log 3)$$

$$x = \frac{3 \log 3}{\log 2 - \log 3}$$

$$\boxed{x = -8.13}$$

18) $\log x + \log(x-3) = 1$

Ex9) $\ln(3x-2) + \ln(x-1) = 2 \ln x$

$$\ln[(3x-2)(x-1)] = \ln x^2$$

$$3x^2 - 3x - 2x + 2 = x^2$$

$$2x^2 - 5x + 2 = 0$$

$$(2x-1)(x-2) = 0$$

$$2x-1=0 \quad x-2=0$$

$$2x=1 \quad \boxed{x=2}$$

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

11) $\ln(5x-1) = \ln(x+2) + \ln 2$

$$\ln(5x-1) = \ln(2x+4)$$

$$5x-1 = 2x+4$$

$$3x=5 \quad \boxed{x=5/3}$$

13) $e^{2x} - 28 = 3e^x$

$$(e^x)^2 - 3e^x - 28 = 0$$

$$(e^x - 7)(e^x + 4) = 0$$

$$e^x - 7 = 0 \quad e^x + 4 = 0$$

$$e^x = 7 \quad e^x = -4$$

$$\ln e^x = \ln 7 \quad \ln e^x = \ln(-4)$$

$$x \cdot \ln e = \ln 7$$

$$\boxed{x = \ln 7}$$

15) $36^{x+2} = 6^{x-1}$

$$(6^2)^{x+2} = 6^{x-1}$$

$$6^{2x+4} = 6^{x-1}$$

$$2x+4 = x-1$$

$$\boxed{x = -5}$$

$$\log(4x-1) = \log(x+1) + \log 2$$

19) $e^{2x} - 5e^x + 6 = 0$

$$(e^x - 3)(e^x - 2) = 0$$

$$e^x - 3 = 0 \quad e^x - 2 = 0$$

$$e^x = 3$$

$$e^x = 2$$

$$\boxed{x = \ln 3}$$

$$\boxed{x = \ln 2}$$

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3. $\ln(x-1) + \ln 3 = 8$

$$\ln(3x-3) = 8$$

$$e^8 = 3x-3$$

$$3+e^8 = 3x$$

$$x = \frac{3+e^8}{3} = 1 + \frac{1}{3}e^8$$

5. $\ln(x+2) + \ln(x) = \ln 35$

$$\ln(x^2+2x) = \ln 35$$

$$x^2+2x = 35$$

$$x^2+2x-35 = 0$$

$$(x+7)(x-5) = 0$$

$$x = -7 \quad \boxed{x=5}$$

9. $e^x \cdot e^{3x} = 4$

$$e^{4x} = 4$$

$$\ln e^{4x} = \ln 4$$

$$4x \cdot \underbrace{\ln e}_1 = \ln 4$$

$$\boxed{x = \frac{\ln 4}{4}}$$

13. $\ln e^{2x} = 6$

$$e^6 = e^{2x}$$

$$6 = 2x$$

$$\boxed{3 = x}$$

11. $e^9 = (e^x)^3 \left(\frac{1}{e^9}\right)$

$$e^9 = \frac{e^{3x}}{e^9}$$

$$e^9 = e^{3x-9}$$

$$9 = 3x - 9$$

$$18 = 3x$$

$$\boxed{6 = x}$$