Section 5.8: Inverse Functions and Logarithms

Pr 1. Rewrite each exponential expression as an equivalent logarithmic expression.

(a) $9^{x-1} = 245$

(b) $10^{2x-7} = \frac{3}{1000}$

Pr 2. Rewrite each logarithmic expression as an equivalent exponential expression.

(a) $\log_{\frac{5}{4}}\left(5x^2\right) = 8$

(b) $\ln(x) = 4$

Pr 3. State the domain of each algebraic function, using interval notation.

(a) $f(x) = \log_5(5x - 2)$

(b) $g(x) = \log\left(\sqrt{8x + 1}\right)$

(c) $h(x) = \dfrac{\ln(6 - x)}{x^2 + 4x + 4}$

Pr 4. Simplify $\ln\left(e^{4x-13}\right)$.

Pr 5. Express each expression as a single logarithm. Assume when necessary that all variables/expressions represent positive real numbers.

(a) $3\log(x) - \log(x+1) - \log(x-1)$

(b) $\frac{1}{2}\left(-\ln(x-2) + 5\ln(3x+8) + 2\ln(8-x)\right)$

Pr 6. Use the properties of logarithms to fully expand and simplify each expression. Assume when necessary that all variables/expressions represent positive real numbers.

(a) $\log_b\left(\sqrt{\dfrac{x-2}{x}}\right)$

(b) $\ln\left(\dfrac{\sqrt{3-x}}{3x(x-7)}\right)$

Pr 7. Algebraically solve each equation for x.

(a) $32^x = 18^{x+1}$

(b) $(e^{x^2}-4)(e^x+1)=0$

Pr 8. Algebraically solve each equation for x.

(a) $3\ln(x+4) - 5 = 8$

(b) $\log(x+3) + \log(x-1) = \log(15-2x)$

Pr 9. If you invest \$2000 in an account that earns interest at a rate of 3.16% per year, compounded continuously, how long will it take for the amount in the account to triple?