Practice of logarithm functions

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Exercise 1   What is the base of the function $f(x) = \log_9 x$. Evaluate the function at $x = 9, 1, 1/9, 81$ and 3.

Exercise 2   The natural logarithmic function $f(x) = \ln x$ has a vertical or horizontal asymptote at $x =$.

Exercise 3   The natural logarithmic function $f(x) = \ln(x - 1)$ has a vertical or horizontal asymptote at $x =$.

Exercise 4   Find the domain of the functions, $f(x) = \log_{10}(x + 3), \quad g(x) = \ln(x - x^2)$.

Exercise 5   Let a be a positive number, with $a \neq 1$. Let A, B and C be any real numbers with $A > 0$ and $B > 0$. Write the 3 laws of logarithms.

Exercise 6   Use the Laws of Logarithms to combine the following expressions,

$$\log_4(6) + 2\log_4(7), \quad 2\log(x) - 3\log(x+1)$$
$$4\log x - \frac{1}{3}\log(x^2 + 1) + 2\log(x - 1), \quad \log_a b + c\log_a(d) - r\log_a(s)$$

Exercise 7   Perform the indicated operations and simplify,

$$\frac{1 + \frac{1}{c-1}}{1 - \frac{1}{c-1}}, \quad \left(-\frac{2r}{s}\right)\left(-\frac{s^2}{6t}\right)$$

Exercise 8   Using the Law of Exponents to rewrite and simplify the expressions,

$$\frac{x^9(2x)^4}{x^3}, \quad \frac{a^n(a^{2n+1})}{a^{n-2}}, \quad (2x^2 y^4)^{3/2}$$

Extra Exercise   Proof the 3 laws of logarithms.