

MA1200 Practice Exercise 5 Exponential and Logarithmic Functions

1. Determine whether each of the following is true or false. If it is false, give a counterexample.
 - i. If N is positive, then as N increases, $\log_5 N$ increases. (T / F)
 - ii. If a, b are positive number such that $a > b > 1$, then $\log_a 10 > \log_b 10$. (T / F)
 - iii. If $N > 0$, then $\log_e N = \ln N$ (T / F)
 - iv. $a^x > a^{x-1}$ for all real numbers a and x . (T / F)
 - v. If $y = a^x$, where $a > 1$, then $x = \log_a y$. (T / F)
 - vi. For any $a > 1$, $\log_a 1 = 0$. (T / F)
2. Write each equation in its equivalent exponential form.
 - (a) $y = \log_5 25$
 - (b) $x = \ln 100$
 - (c) $\log 92 = y$
3. Write each equation in its equivalent logarithmic form.
 - (a) $15^8 = y$
 - (b) $b^5 = y$
 - (c) $e^{x+1} = 90$
4. For each of the following, (a) plot the graph; (b) find the domain and the range of the function.
 - (i) $f(x) = 2^{(x-3)} + 1$
 - (ii) $f(x) = e^{2x} - 1$
 - (iii) $f(x) = -10^{(x-1)}$
 - (iv) $f(x) = 1 + \log(x+2)$
 - (v) $f(x) = -2 \ln x$
5. For each of the following, (a) plot the graph; (b) find the domain and the range of the function.
 - (a) $y = \log \frac{10}{x^2}$
 - (b) $y = \log \frac{x+1}{100}$
 - (c) $y = \ln \frac{x-1}{e^3}$
6. Solve the following equations:
 - (a) $2^x = 3$
 - (b) $7^{x+1} = 5$
 - (c) $3^{x-1} = 2^{x+1}$
 - (d) $9^{x+1} = 12^{x-1}$
 - (e) $\log(x+1) + \log 3 = \log 18$
7. Express y in terms of x for each of the following.
 - (a) $\ln(y-5) = kx + c$
 - (b) $-\ln(y-12) = kx^2 + c$
 - (c) $\ln(y+23) = kx^3 + c$