Logarithmic Formula

1. if n and a are positive real numbers, and a is not equal to 1, then
   If $a^x = n$, then $\log_a n = x$
2. $\log_a n$ is called logarithmic function. The domain of logarithmic function is positive real numbers and the range is all real numbers.
3. **log of 1 to any base is 0**
   $\log_b 1 = 0$
4. **log of any number to base as itself is 1**,
   $\log_a a = 1$
5. **Logarithm of a Product**
   $\log_a pq = \log_a p + \log_a q$
6. **Logarithm of a Fraction**
   $\log_a (p/q) = \log_a p - \log_a q$
7. $\log_a p^n = n \log_a p$
8. $a^{(\log_a p)} = p$
9. **Base Change Rule of Logarithms**:
   $\log_a n = \log_b n \times \log_a b$
10. $\log_a b = (\log_n b)/(\log_n a)$
11. **if the base is 10, then**
    $\log_a b = (\log b)/(\log a)$
12. $(\log_a b) \times (\log_b a) = 1$
13. $\log_a b = 1/\log_b a$
14. $\log (m + n)$ is not equal to $\log m + \log n$
15. $\log_{a^n} p = 1/n (\log_a p)$
16. $\log_{a^n} b^m = (m/n)\log_a b$
17. $\log_{10} b$ is called **common logarithm** because the base is 10
18. $\log_e b$ is called **natural logarithm**. It is denoted by ln b.
19. $\log_{1/a} b = -\log_a b$
20. $\log_a (1/b) = -\log_a b$
21. $\log_{1/a} (1/b) = \log_a b$