

1.3 Exponential Functions

Exponential Function: Let a be a positive real number other than 1. The function

$$f(x) = a^x$$

is the exponential function with base a .

Exponent Rules		
1. $a^m * a^n = a^{m+n}$	2. $(a^m)^n = a^{mn}$	3. $(ab)^m = a^m b^m$
4. $(a^m b^n)^p = a^{mp} b^{np}$	5. $\frac{a^m}{a^n} = a^{m-n}$	6. $a^0 = 1 \quad a \neq 0$
7. $a^{-n} = \frac{1}{a^n}$	8. $\frac{a^{-m}}{b^{-n}} = \frac{b^n}{a^m}$	9. $a^1 = a$

Half-life: The amount of time a radioactive substance takes for half of the substance to change from radioactive to not radioactive state.

Exponential Growth and Decay: The function $y = k * a^x$, where $k > 0$ means growth if $a > 1$, and where $0 < a < 1$ means decay.

Types of Interest	
Compound Interest	Continuously Compound Interest
$A = p\left(1 + \frac{r}{n}\right)^{nt}$ <ul style="list-style-type: none"> • P is the principle • r is the rate as a decimal • n is the number of time per year the interest is compounded • t is the number of years 	$A = Pe^{rt}$

Logarithms: Remember that $\log_b x = y$ and $b^y = x$ are equivalent.