Limits Rules … Set 1

I. The Limit Laws

Assumptions: c is a constant and $\lim_{x\to a} f(x)$ and $\lim_{x\to a} g(x)$ exist

	Limit Law in symbols	Limit Law in words
1	$\lim_{x\to a}[f(x)+g(x)] = \lim_{x\to a} f(x) + \lim_{x\to a} g(x)$	The limit of a sum is equal to the sum of the limits.
2	$\lim_{x\to a}[f(x)-g(x)] = \lim_{x\to a} f(x) - \lim_{x\to a} g(x)$	The limit of a difference is equal to the difference of the limits.
3	$\lim_{x\to a} cf(x) = c\lim_{x\to a} f(x)$	The limit of a constant times a function is equal to the constant times the limit of the function.
4	$\lim_{x\to a}[f(x)g(x)] = \lim_{x\to a} f(x)\cdot\lim_{x\to a} g(x)]$	The limit of a product is equal to the product of the limits.
5	$\lim_{x\to a}\frac{f(x)}{g(x)} = \frac{\lim_{x\to a} f(x)}{\lim_{x\to a} g(x)}$ $\left(if \lim_{x\to a} g(x)\neq 0\right)$	The limit of a quotient is equal to the quotient of the limits.
6	$\lim_{x\to a}[f(x)]^n = [\lim_{x\to a} f(x)]^n$	where n is a positive integer
7	$\lim_{x\to a} c = c$	The limit of a constant function is equal to the constant.
8	$\lim_{x\to a} x = a$	The limit of a linear function is equal to the number x is approaching.
9	$\lim_{x\to a} x^n = a^n$	where n is a positive integer
10	$\lim_{x\to a}\sqrt[n]{x} = \sqrt[n]{a}$	where n is a positive integer & if n is even, we assume that $a>0$
11	$\lim_{x\to a}\sqrt[n]{f(x)} = \sqrt[n]{\lim_{x\to a} f(x)}$	where n is a positive integer & if n is even, we assume that $\lim_{x\to a} f(x) > 0$

Direct Substitution Property: If f is a polynomial or rational function and a is in the domain of f, then $\lim_{x\to a} f(x) =$

"Simpler Function Property": If $f(x) = g(x)$ when $x \neq a$ then $\lim_{x\to a} f(x) = \lim_{x\to a} g(x)$, as long as the limit exists.