Algebraic Limit Properties **Calculus 1** **9/16/15**

Let a and c be constants. Then

Constant Law for Limits: $\lim_{x \to a} k = k$

Law X for Limits: $\lim_{x \to a} x = a$

And as long as $\lim_{x \to a} f(x)$ and $\lim_{x \to a} g(x)$ are real numbers,

Sum Law for Limits: $\lim_{x \to a}\left[f(x)+g(x)\right] = \lim_{x \to a} f(x) + \lim_{x \to a} g(x)$

Difference Law for Limits: $\lim_{x \to a}\left[f(x)-g(x)\right] = \lim_{x \to a} f(x) - \lim_{x \to a} g(x)$

Constant Multiple Law for Limits: $\lim_{x \to a}\left[c \cdot f(x)\right] = c \cdot \lim_{x \to a} f(x)$

Product Law for Limits: $\lim_{x \to a}\left[f(x) \cdot g(x)\right] = \lim_{x \to a} f(x) \cdot \lim_{x \to a} g(x)$

Quotient Law for Limits:* $\lim_{x \to a} \frac{f(x)}{g(x)} = \frac{\lim_{x \to a} f(x)}{\lim_{x \to a} g(x)}$

Power Law for Limits:** $\lim_{x \to a}\left[f(x)\right]^{p/q} = \left[\lim_{x \to a} f(x)\right]^{p/q}$

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* provided $\lim_{x \to a} g(x) \neq 0$.

** provided $\lim_{x \to a} f(x) \geq 0$ when q is even and $\lim_{x \to a} f(x) \neq 0$ if $p/q < 0$.