Algebraic Limit Properties **Calculus 1** **9/12/16**

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

---

* 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 $p/q < 0$.