Limits Laws

1. $\lim_{x\to a}[f(x)+g(x)]=\lim_{x\to a}f(x)+\lim_{x\to a}g(x)$ The limit of the sum is 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 the difference is 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 the limit of the function times the constant.

4. $\lim_{x\to a}[f(x)\bullet g(x)]=\lim_{x\to a}f(x)\bullet\lim_{x\to a}g(x)$ The limit of the product is the product of the limits.

5. $\lim_{x\to a}\frac{f(x)}{g(x)}=\frac{\lim_{x\to a}f(x)}{\lim_{x\to a}g(x)}$ *if* $\lim_{x\to a}g(x)\neq 0$ The limit of the quotient is the quotient of the limits.

6. $\lim_{x\to a}[f(x)]^n=\left[\lim_{x\to a}f(x)\right]^n$

7. $\lim_{x\to a}\sqrt[n]{x}=\sqrt[n]{a}$

8. $\lim_{x\to a}\sqrt[n]{f(x)}=\sqrt[n]{\lim_{x\to a}f(x)}$

Some Basic Limits

1. $\lim_{x\to c}b=b$

2. $\lim_{x\to c}x=c$

3. $\lim_{x\to a}x^n=c^n$

4. If p is a polynomial function and c is a real number: $\lim_{x\to c}p(x)=p(c)$

5. If r is a rational function given by $r(x)=\frac{p(x)}{q(x)}$ and c is real number such that $q(c)\neq 0$

$$\lim_{x\to c}r(x)=r(c)=\frac{p(c)}{q(c)}$$