

1. Limit laws:

$$\lim_{x \rightarrow a} [f(x) + g(x)]$$

$$\lim_{x \rightarrow a} [f(x) - g(x)]$$

$$\lim_{x \rightarrow a} f(x)g(x)$$

$$\lim_{x \rightarrow a} kf(x)$$

$$\lim_{x \rightarrow a} \frac{f(x)}{g(x)}$$

2. Squeeze theorem:

$$f(x) < g(x) < h(x)$$

3.  $\epsilon - \delta$  definition of limit:  $\lim_{x \rightarrow a} f(x) = L$  means that for every  $\epsilon > 0$  there exists a  $\delta > 0$  such that

$$0 < |x - a| < \delta \implies |f(x) - L| < \epsilon$$

4. Intermediate value theorem: a continuous function on  $[a, b]$  takes on all values between  $f(a)$  and  $f(b)$ .

5. Definition: differentiable at a point.

6. Linearizations at a point  $x$ :  $L(x) = f(a) + f'(a)(x - a)$

Differentials.

7. Mean value theorem (and Rolle's Theorem)

8. Extrememe value theorem: a continuous functions on a closed and bounded set has a global maximum and a global minimum.

9. L'Hopital's rule:  $\frac{0}{0}$ ,  $\frac{\infty}{\infty}$ ,  $\infty \cdot 0$ ,  $0^0$ ,  $1^\infty$