MAC 2311 Hybrid Calculus I

Sections **4.1**

**Derivatives and Graphs**

**Critical Points (values)**

If the point (c, *f*(c)) is in the domain of the function, (c, *f*(c)) is called a critical point (CP) of if or does not exist (DNE). The number c is called a critical value (CV).

Eg1. Find the CPs of Ans: (1,11/6), (2,5/3)

Eg2. Find the CPs Ans: (1,0)

Eg3. Find the CPs Ans: None

Eg4. Find the CPs Ans: (1,1/e)n

Eg5. Find the CPs Ans: (0,-1), (2,1/3)

**Relative (local) Extrema**

If has a relative or local extrema (relative max/min) at the point (c, *f*(c)), and is defined, then. The converse is not true. If the derivative is zero, you may or may not may or may not have a relative extrema.

Eg6. Ans: a local min.

Eg7. Ans: neither max nor min.

**Absolute Extrema**

If is a continuous function on the interval [a, b], the absolute extrema (abs max/min) will occur either at the critical points or at the end points.

Eg8. Find the Absolute Extrema of in [-1, 2] Ans: abs max (2,3), abs min (0,-1)

If is a continuous function on the interval (a, b), the absolute extreme values (if they exist) will occur at interior points of the interval.

Eg9. Find the Absolute Extrema of in(-1, 2) Ans: abs max none, abs min (0,-1)

Eg10. Find the Absolute Extrema of in [0, π/ 2] Ans: abs max (π/6, abs min (π/2,0)

Eg11. Find the Absolute Extrema of in [-1, 1] Ans: abs max (1,ln3), abs min (1/2,ln(3/4))