Outline before Winter Break: **Calculus FYI**

11/30 Today: Extrema, Critical Numbers

12/2 Wed: Mean Value Theorem

12/4 Fri: Assessment[1] (CD8, AD789); First and Second Derivative Tests

(a concept, not a test to take)

Thu after school review session

12/7 Mon: Derivatves MC test (45 min, calculators)

Bingo/Review due

12/9 Wed: Related Rates: an application of implicit diff.

12/11 Fri: Assessment[1] (AD10, 11, 12, 13), Optimization

12/14 Mon: Assessment[1] (AD 14, 15, 16)

12/16 Wed: Linearization, and Assessment (AD 18)

[1] will do practice tests for each

stuff 2 add 2 booklet

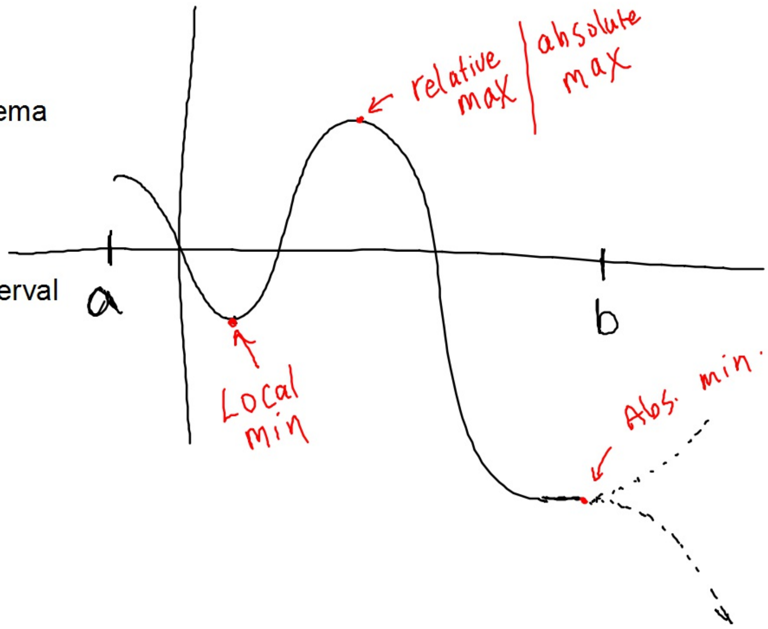
- Inverse Derivatives formula
- Implicit Differentiation technique
- Extreme Value Theorem:

a continuous function on a closed interval will attain a maximum and a minimum value on the interval

Notes:

Absolute vs Relative Extrema
(Global)   (Local)

Always defined over an interval



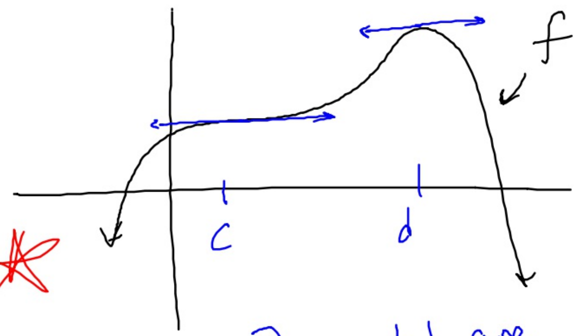
What is a critical number?

where f ' equals 0 or is undefined/discontinuous (where f has non diff. points)

All Relative Extrema Occur At Critical Numbers

BUT

Not All Critical Numbers Yield Relative Extrema



$$\left.\begin{aligned} f'(c) &= 0 \\ f'(d) &= 0 \end{aligned}\right\} \Rightarrow c \,\&\, d \text{ are crit. numbers.}$$

Finding absolute extrema:

(described on p . 165)

$g(t) = 2t^3+3t^2-12t+4$ on the interval [-4,2]

$g'(t) = 6t^2+6t-12 = 0$

$6(t^2+t-2) = 0$

$6(t+2)(t-1) = 0$

$\underbrace{t=-2 \quad t=1}_{\text{Crit. numbers.}}$

plug these AND endpoints into g(t).

$g(-4) = -28 \leftarrow$ abs min (-4,-28)

$g(-2) = 24 \leftarrow$ Abs max (-2, 24)

$g(1) = -3$

$g(2) = 8$

HW: Pg 164 #17-26 (D-AD 7 and 8)