

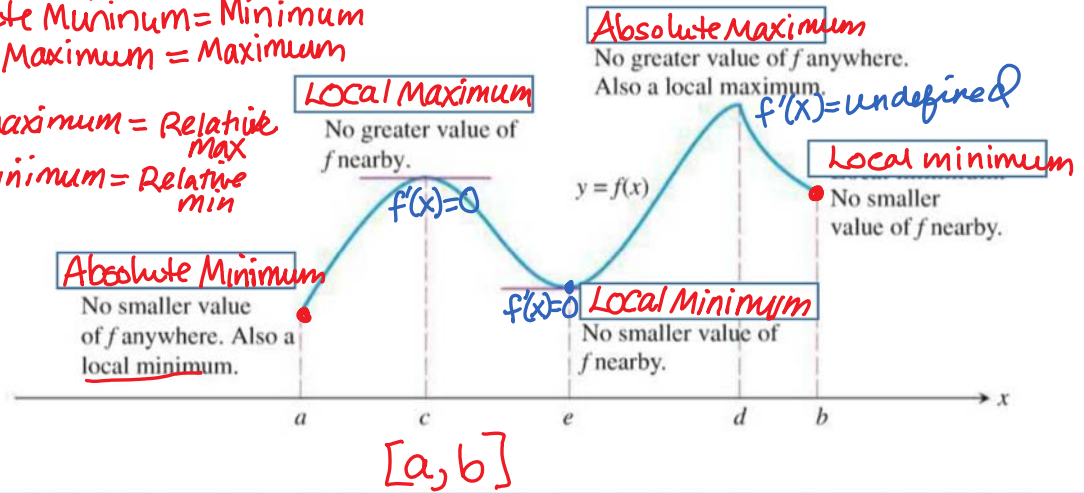
5.1 Notes

Tuesday, October 25, 2016 3:22 PM

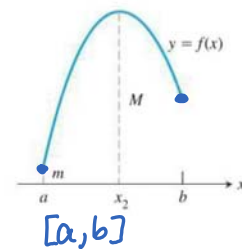
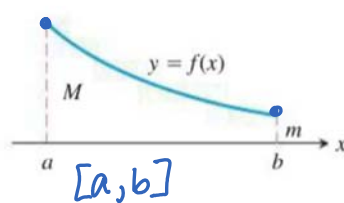
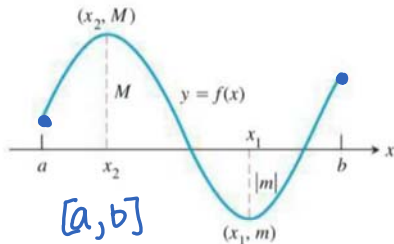
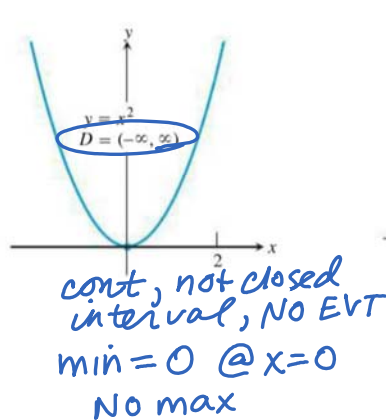
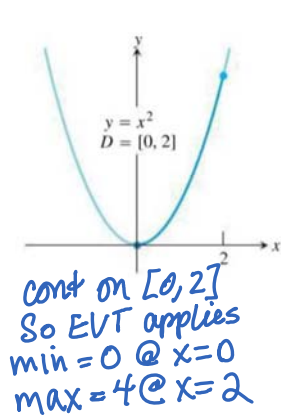
Extrema

Absolute Minimum = Minimum
 Absolute Maximum = Maximum

Local maximum = Relative max
 Local Minimum = Relative min



Extreme Value Theorem (EVT)
 A continuous function on a closed interval has both a maximum and a minimum value. (absolute)



Finding Extreme Values *Check 2 places:*

1. Endpoints if interval is closed (or domain is restricted)

2. Critical Points: where $f'(x)=0$ or $f'(x)$ is undefined
May be a max or min

① $f(x) = e^{-x^2}$ $-1 \leq x \leq 2$ *Find all local + absolute maxes and mins*

① Endpts: $f(-1) = e^{-(-1)^2} = e^{-1} = \frac{1}{e} \approx .368$

$f(2) = e^{-(2)^2} = e^{-4} = \frac{1}{e^4} = .018$

② Crit pts: $f'(x) = e^{-x^2} \cdot -2x$ Never und

$e^{-x^2} \cdot -2x = 0$ find $f(0)$:
 $x=0$ $f(0) = e^{-0^2} = 1$

x	f(x)	
-1	.368	Local Min
0	1	Abs. Max
2	.018	Abs. Min

② $f(x) = x^3 + 4x^2 + 6$ $[-3, 1]$

① Endpts: $f(-3) = (-3)^3 + 4(-3)^2 + 6 = 15$
 $f(1) = 1^3 + 4(1)^2 + 6 = 11$

② Crit Pts: $f'(x) = 3x^2 + 8x = 0$

$x(3x+8) = 0$

$x = 0, -\frac{8}{3}$

$f(0) = 6$

$f(-\frac{8}{3}) = \frac{418}{27}$

x	f(x)
-3	15
$-\frac{8}{3}$	$\frac{418}{27}$
0	6
1	11

Local Min
15.48 Abs Max
Abs Min
Local Max