1.2 Day 2

Obj: 1. Extrema → min & max
2. Inc/Dec
3. Even/odd

Find VA, HA, Domain $f(x)=\frac{x^1}{x^2-x-2}$

VA: $x^2-x-2=0$
$(x-2)(x+1)=0$
$x-2=0 \quad x+1=0$
$x=2 \quad x=-1$

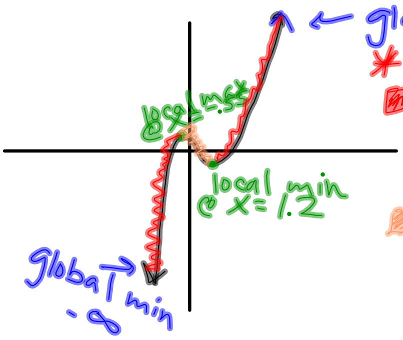
HA: $y=0$

D: $x\neq 2 \quad x\neq -1$
$(-\infty,-1)\cup(-1,2)\cup(2,\infty)$

Sep 12-8:36 AM

Extrema: min/max

$f(x)=x^3-x^2-2x$



← global max: ∞

* use x values!!!

increasing $(-\infty,-.55)\cup(1.2,\infty)$

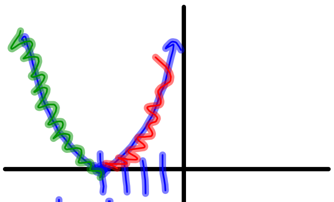
decreasing $(-.55,\ 1.2)$

local max: fnc changes from inc to dec.
local min: fnc " " dec to inc.

Sep 12-9:53 AM

Identify the local extrema & intervals of increasing & decreasing:

$$f(x) = (x+4)^2$$



min @ $x=-4$
no max.

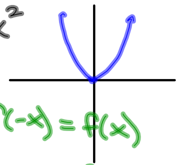
dec: $(-\infty, -4)$
inc: $(-4, \infty)$

Sep 12-10:01 AM

Even/Odd

Even: Symmetric over y-axis

$f(x) = x^2$

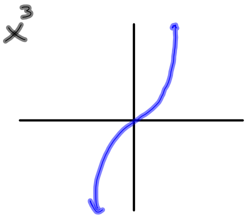


test: $f(-x) = f(x)$

$f(-x) = (-x)^2 = x^2 = f(x)$

Odd: Symmetric over the origin

$f(x) = x^3$



Test: $f(-x) = -f(x)$

$f(-x) = (-x)^3 = -x^3 = -f(x)$

Sep 12-10:06 AM

Verify the fnc is even, odd or neither:

$-h(x) = \frac{-1}{1}\left(\frac{x^3}{4-x^2}\right) = \frac{-x^3}{4-x^2}$

a. $f(x) = x^2 - 3$

$f(-x) = (-x)^2 - 3$

$= x^2 - 3 = f(x)$

even

b. $h(x) = \frac{x}{4-x^2}$

$h(-x) = \frac{(-x)^3}{4-(-x)^2} = \frac{-x^3}{4-x^2}$

odd $= -h(x)$

c. $g(x) = x^2 - 2x - 2$

$g(-x) = (-x)^2 - 2(-x) - 2$

$g(-x) = x^2 + 2x - 2 \neq g(x)$

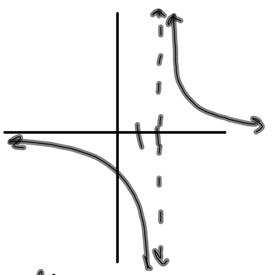
$\neq -g(x)$

neither

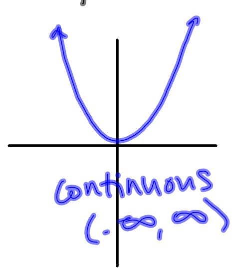
Sep 12-10:10 AM

Continuity

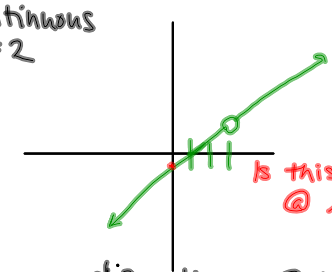
if there is a domain restriction, a fnc isn't continuous at that point



discontinuous @ x=2



continuous $(-\infty, \infty)$



Is this fnc. continuous @ x=0? Yes!

discontinuous @ x=3 (removable)

Sep 12-10:17 AM