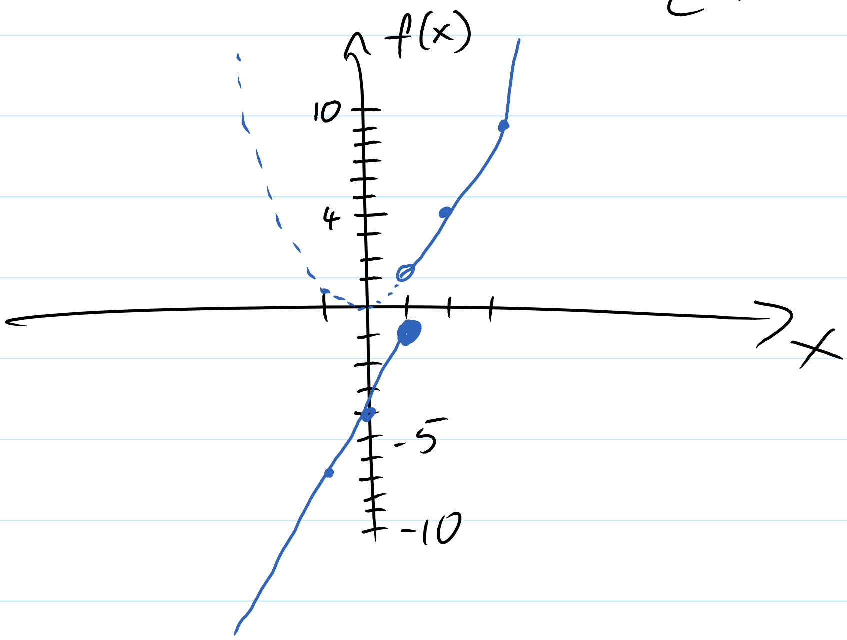
Review: 17 a) $f(x) = \begin{cases} 3x-4, & \text{for } x \le 1 \\ x^2, & \text{for } x > 1 \end{cases}$



$f(-1) = 3\cdot(-1) - 4 = -7$

$f(0) = 3\cdot 0 - 4 = -4$

$f(1) = 3\cdot 1 - 4 = -1$

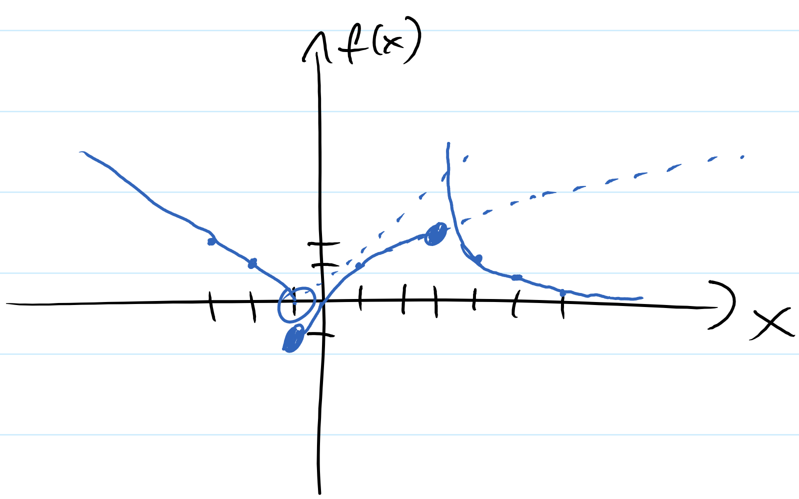
$f(2) = 2^2 = 4$

$f(3) = 3^2 = 9$

$f(4) = 4^2 = 16$

Review 16)

$$f(x) = \begin{cases} |x+1|, & x < -1 \\ \sqrt[3]{x}, & -1 \le x \le 3 \\ \dfrac{1}{x-3}, & x > 3 \end{cases}$$



$f(-3) = |-3+1| = 2$

$f(-2) = |-2+1| = 1$

$f(-1) = \sqrt[3]{-1} = -1$

$f(0) = \sqrt[3]{0} = 0$

$f(1) = 1$

$f(4) = \dfrac{1}{4-3} = 1$

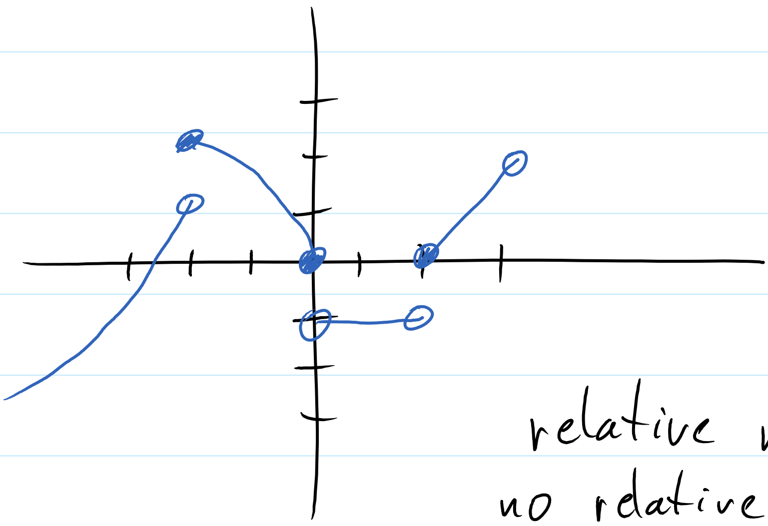
$f(5) = \dfrac{1}{5-3} = 0.5$

$f(6) = \dfrac{1}{6-3} = 0.\overline{3}$

$f(103) = \dfrac{1}{103-3} = \dfrac{1}{100} = 0.0$

$f(103) = \frac{1}{103-3} = \frac{1}{100} = 0.0$

Section 2.2



- increasing on $(-\infty, -2)$ and $(2, 3)$
- decreasing on $(-2, 0)$
- constant on $(0, 2)$

relative maximum at $x = -2$, is 2.

no relative minimum.

Def: A function is increasing/decreasing/constant on an open interval, I, if $f(x_1) < f(x_2)$,

$f(x_1) > f(x_2)$

$f(x_1) = f(x_2)$

where $x_1 < x_2$ and x_1 and x_2 are in I.

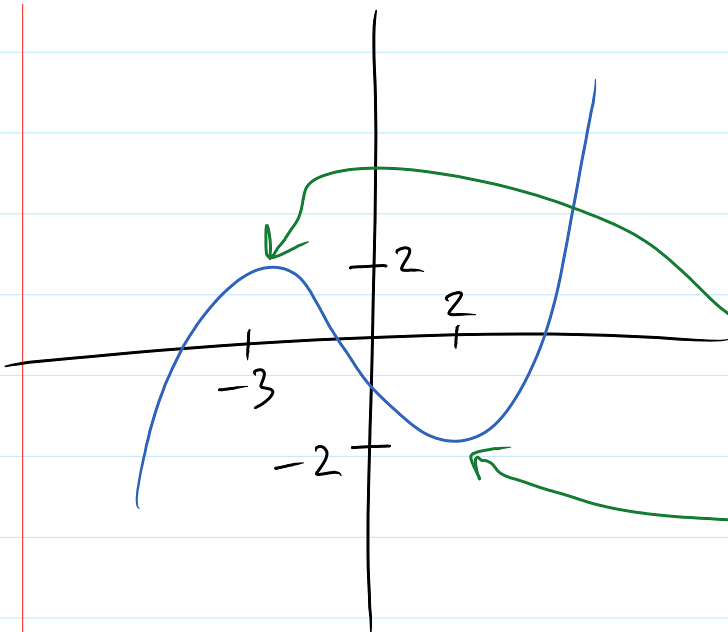
Def: A function value $f(a)$ is a relative maximum of f is the exists an open interval containing a such tha $f(a) > f(x)$

minimum

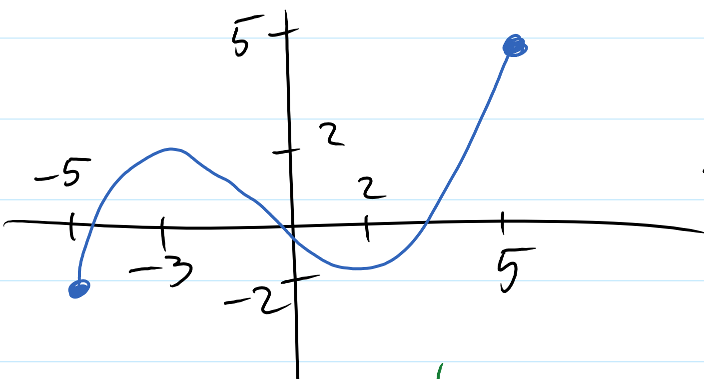
$f(a) < f(x)$

for all $x \neq a$ in the open interval.

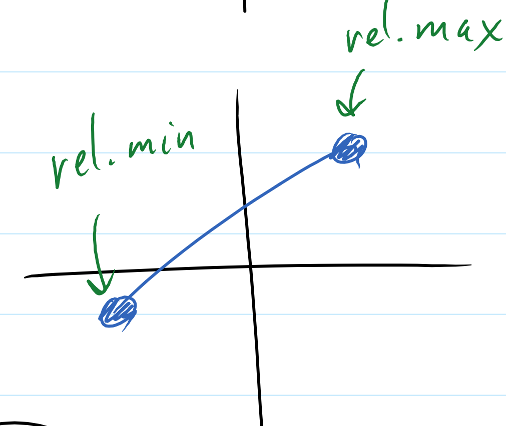
Find relative min/max.

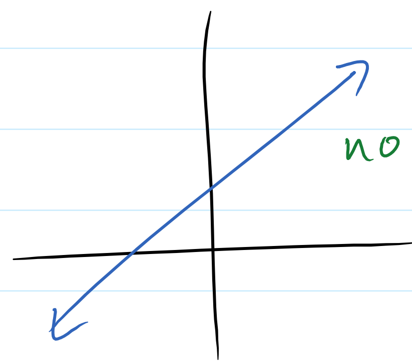


- relative max at $x=-3$ is 2
- relative min -2 at $x=2$.



- relative min -2 at $x=2$ and $x=-5$
- relative max 2 at $x=-3$, and rel. max 5 at $x=5$





no rel. min nor max.

Symmetricity

$$x = y^2 - 1$$

symmetric with respect to x-axis: replace y with $-y$.

$-y$.

$$x = (-y)^2 - 1$$
$$x = y^2 - 1 \checkmark$$

sym. with resp. to y-axis:
replace x with $-x$.

$$(-x) = y^2 - 1$$
$$-x = y^2 - 1 \quad \times$$

sym. with respect to the origin:
replace x with $-x$ and y with $-y$

$$-x = (-y)^2 - 1$$
$$-x = y^2 - 1 \quad \times$$

Check symmetricity:

$$x^2 + y^2 = 3$$

y-axis:
$$(-x)^2 + y^2 = 3$$
$$x^2 + y^2 = 3$$
$\checkmark$

x-axis:
$$x^2 + (-y)^2 = 3$$
$$x^2 + y^2 = 3$$
$\checkmark$

origin:
$$(-x)^2 + (-y)^2 = 3$$
$$x^2 + y^2 = 3$$
$\checkmark$

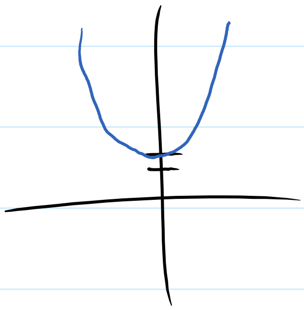
---

for functions:

A function $f(x)$ is odd if $f(-x) = -f(x)$

A function is even if $f(-x) = f(x)$.

$f(x) = x^2+2$ $\quad$ $\underline{f(-x)} = (-x)^2+2 = x^2+2 = \underline{f(x)}$



x^2+2 is even

sym. with resp. to the y-axis