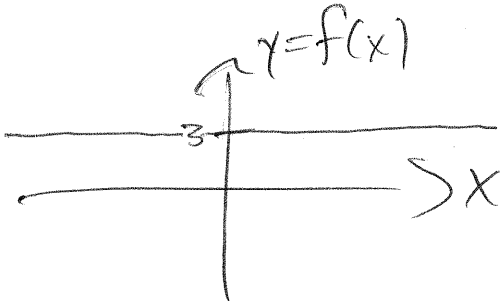
Graphs of Basic functions

A constant function has the form

$$f(x) = c$$

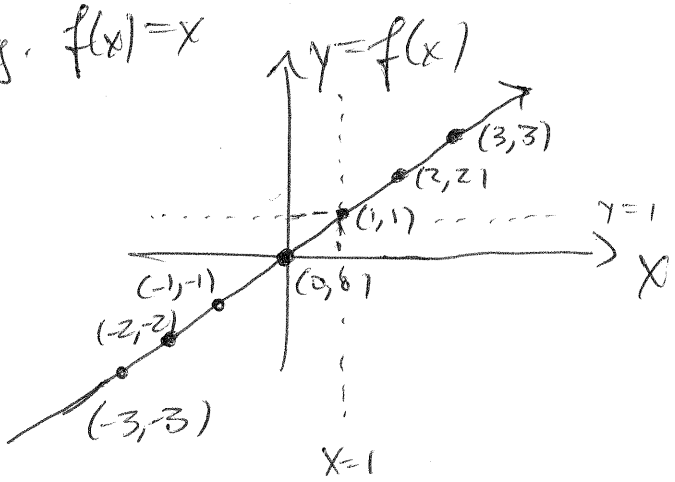
for some number c.

E.g.: $f(x) = 3$

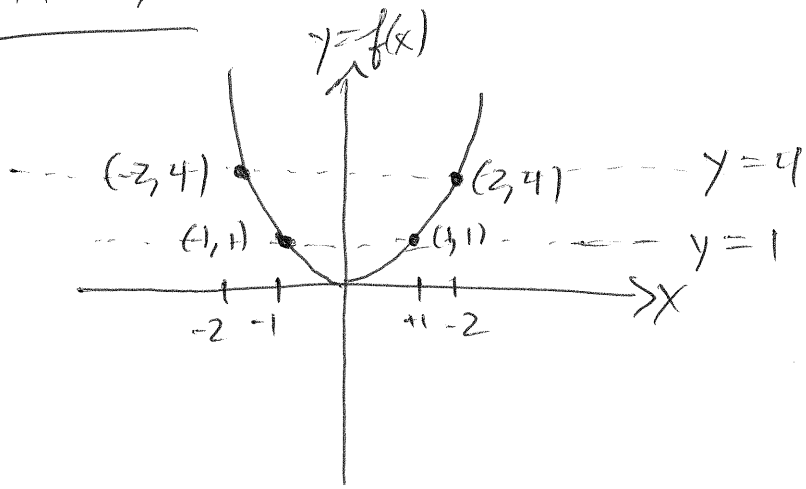


Lines $f(x) = mx + b$, m and b fixed numbers.

E.g. $f(x) = x$

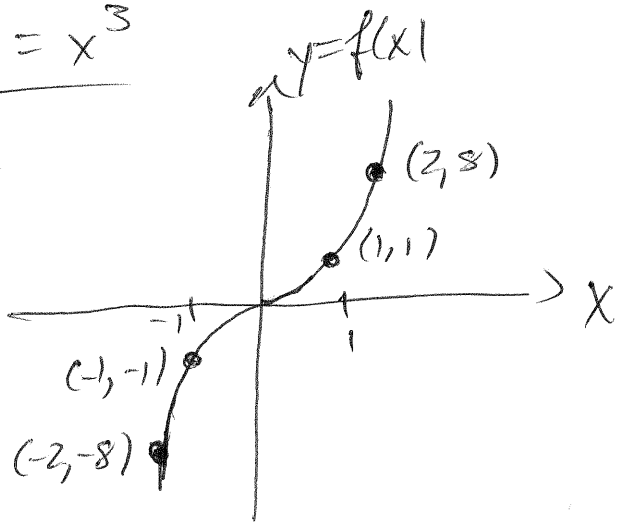


$f(x) = x^2$

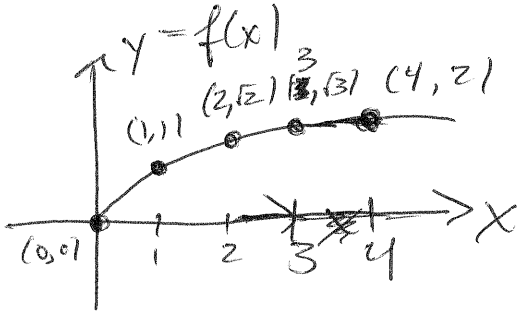


Parabola

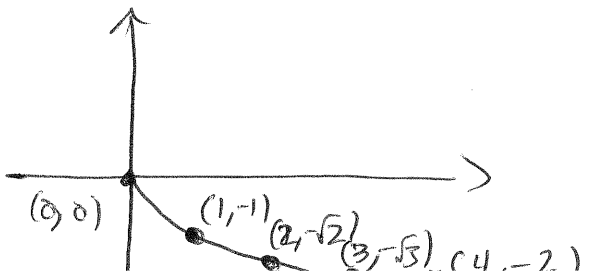
$f(x) = x^3$



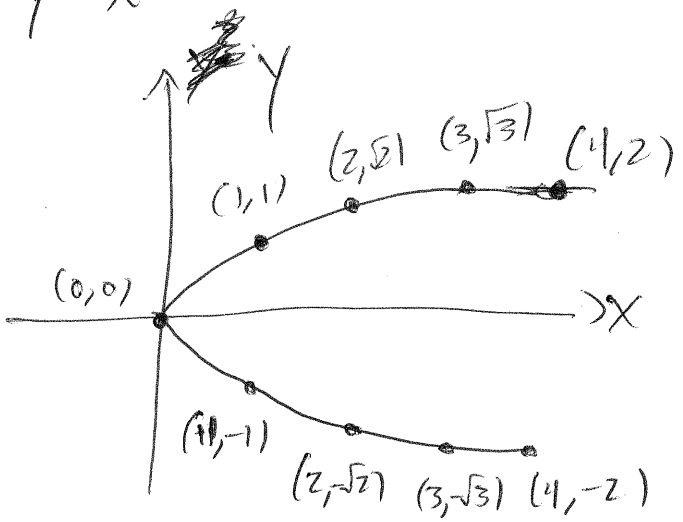
$f(x) = \sqrt{x}$ Domain $[0, \infty)$



$f(x) = -\sqrt{x}$ Domain $[0, \infty)$



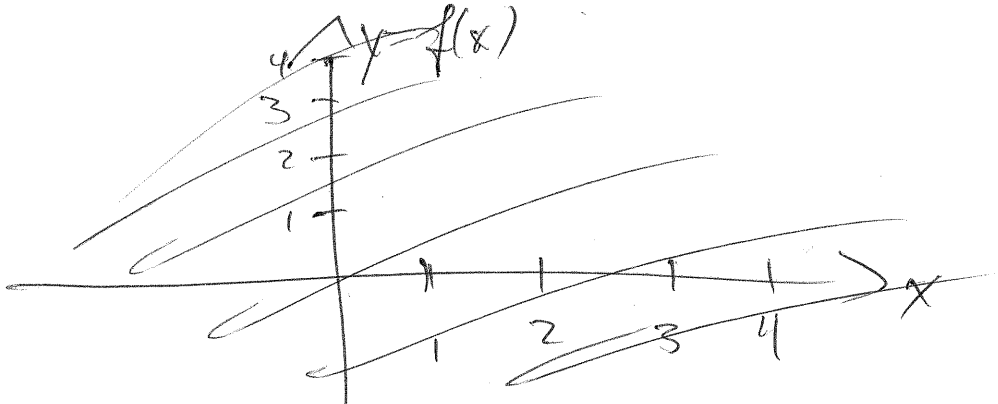
Combining those two we get the graph of $y^2 = x$

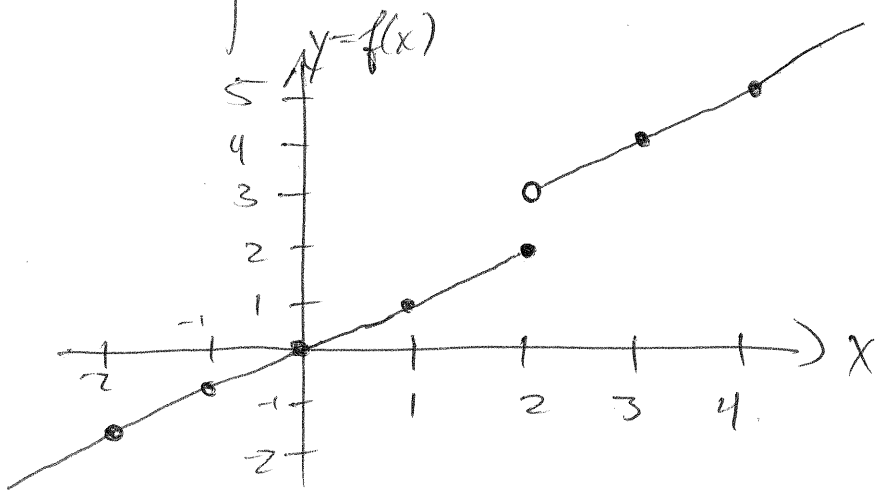


Definitely not a function. Fails the vertical line test.

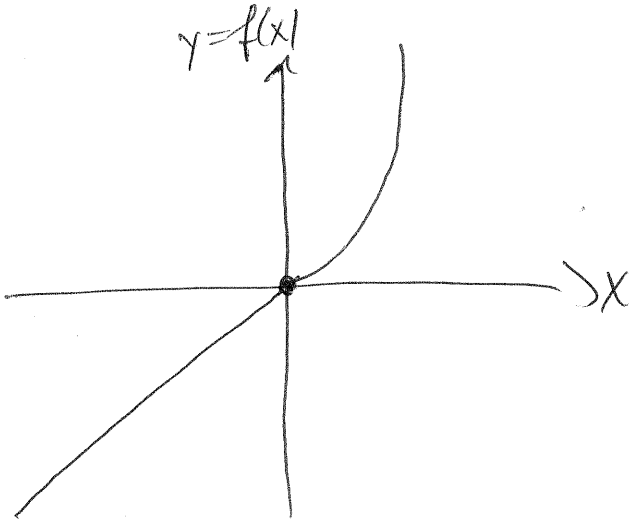
Graphing Piecewise Defined Functions

E.g.: $f(x) = \begin{cases} x & \text{if } x \leq 2, \\ x+1 & \text{if } x > 2. \end{cases}$

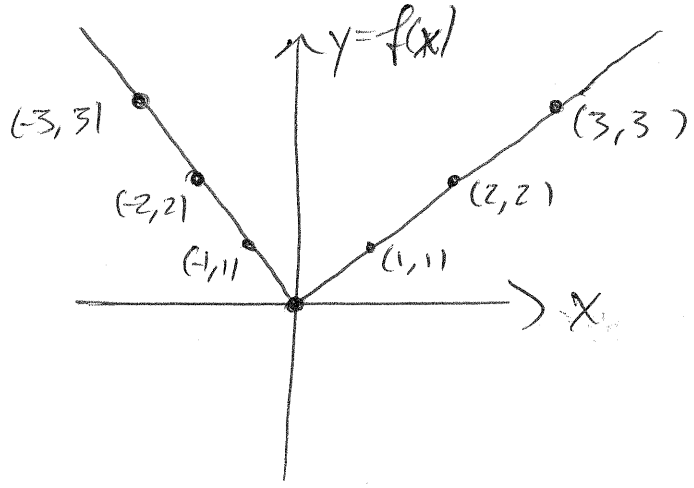




Eg: $f(x) = \begin{cases} x^2 & x \geq 0, \\ x & x < 0 \end{cases}$



Eg: $f(x) = |x| = \begin{cases} x & \text{if } x \geq 0, \\ -x & \text{if } x < 0. \end{cases}$



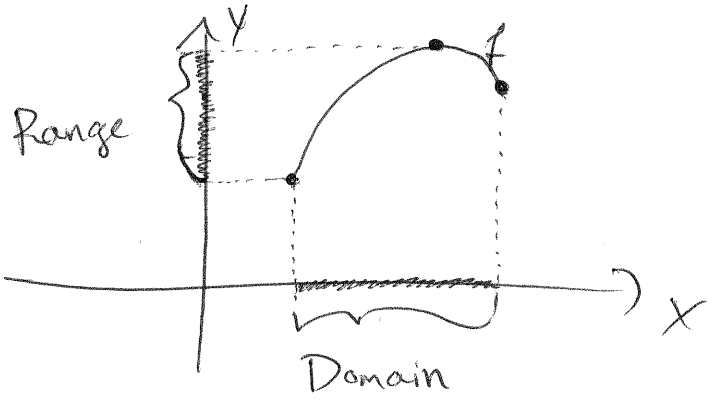
1.7 Working with Functions: Getting Information from the Graph

Read this section

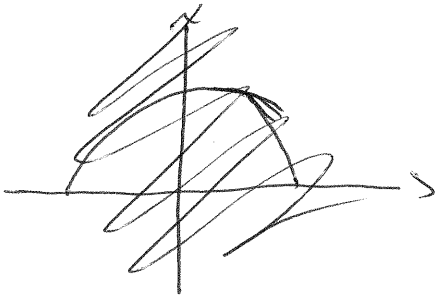
Domain and Range from a Graph

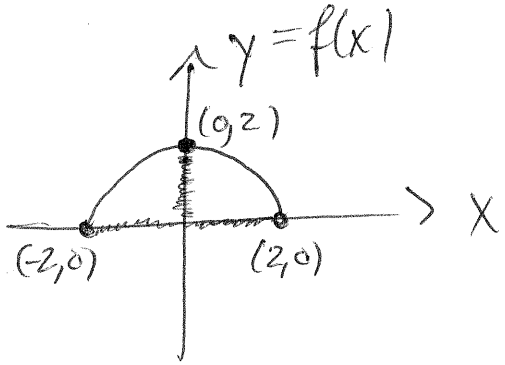
Domain	Range
Inputs	Outputs
Independent Variable	Dependent variable
x-values	y-values

Given a graph



E.g: Let $f(x) = \sqrt{4 - x^2}$



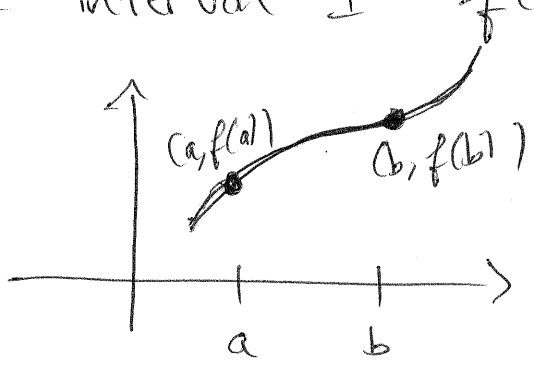


Domain: $[-2, 2]$

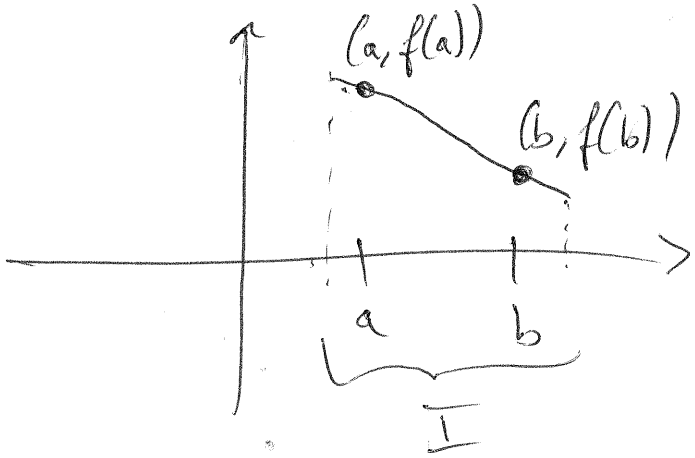
Range: $[0, 2]$

Increasing and Decreasing Functions

Defⁿ: The function f is increasing on the interval I if for any $a < b$ on the interval I $f(a) < f(b)$



The function f is decreasing on the interval I if for any $a < b$ on the interval I, $f(a) > f(b)$



E.g: $f(x) = |x|$ is increasing on $[0, \infty)$ and decreasing on $(-\infty, 0]$