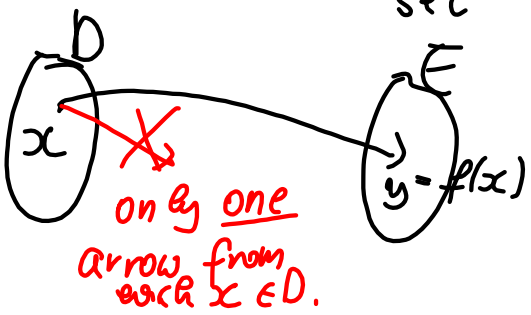
Functions (§ 1.1 - § 1.3) in textbook

$y = f(x)$

set $D \longrightarrow E$ set

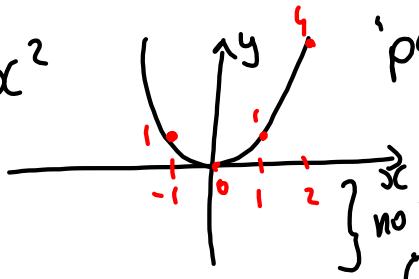


only one arrow from each $x \in D$.

D is called domain of f,

E is called the range of f.

Ex $f(x) = x^2$ 'parabola'



no values here!

table of values:

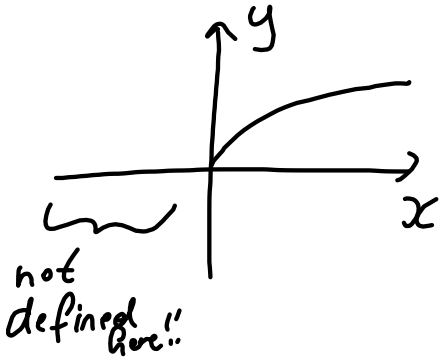
x	y
-1	$(-1)^2 = 1$
0	$0^2 = 0$
1	$1^2 = 1$
2	$2^2 = 4$

$f: \mathbb{R} \to \mathbb{R}$ notation for: goes from $\mathbb{R}$ to $\mathbb{R}$

range of f is actually just $\mathbb{R}_0^+$

all non-negative real numbers incl. 0!

Ex 2: $f(x) = \sqrt{x}$



not defined here!!

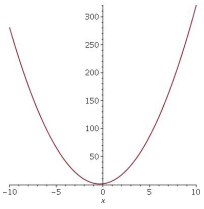
domain of $f: \mathbb{R}_0^+$

range: also $\mathbb{R}_0^+$

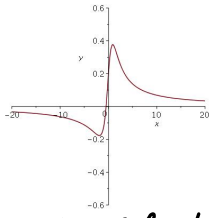
Important functions

- polynomial ex: $f(x) = 3x^2 + 2x + 1$
- rational ex: $f(x) = \frac{2x+1}{3x^2+5}$ (fraction of poly. fcts)
- linear (special polynomial function)
  $f(x) = mx + d$, $m, d \in \mathbb{R}$.
  → graphs are lines
- trigonometric functions $f(x) = \cos(x), \sin(x)$
- exponential functions $f(x) = e^x$
  $\simeq 2.71\ldots$
- logarithmic functions $f(x) = \log(x)$
- power functions (special polynomial functions)
  $f(x) = x^3, x^4, x^7, \ldots, x^{-2} = \frac{1}{x^2}$

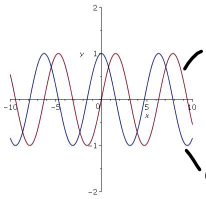
$3x^2+2x+1$



polynomials

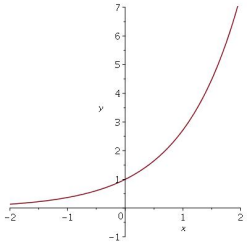


rational function



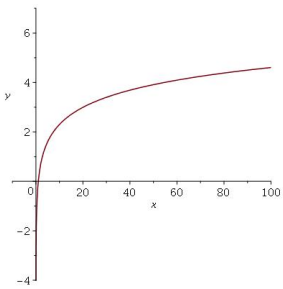
used $\sin(0) = 0$
and $\cos(0) = 1$
to distinguish the plots

trig. functions

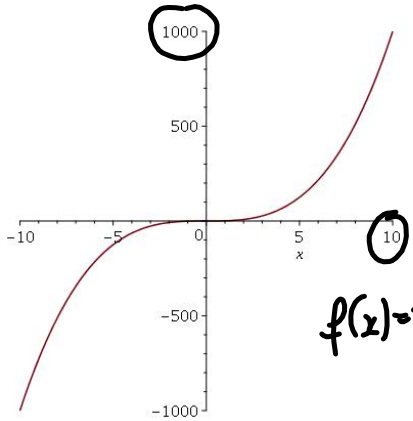


exponential function

e^x



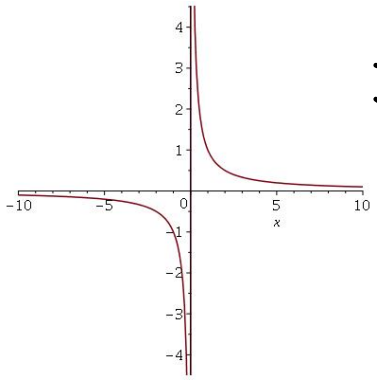
logarithmic function



$f(x)=x^3$

power function

Any x^R, R odd looks similar to this.



x^{-1} (and x^{-R}, R odd looks similar.