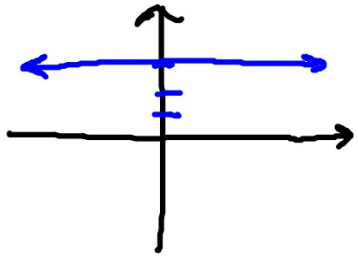
3.4 Library of functions; Piecewise-Defined functions.

I. Library of functions.

① Constant function: $f(x) = B$ or $y = B$

x	$y = 3$
-2	3
-1	3
0	3
1	3
2	3



symmetry: y-axis

(even)/odd/neither

increasing: none

decreasing: none

constant: $(-\infty, \infty)$

max N/A

min N/A

$y = 0x + 3$

D: $(-\infty, \infty)$

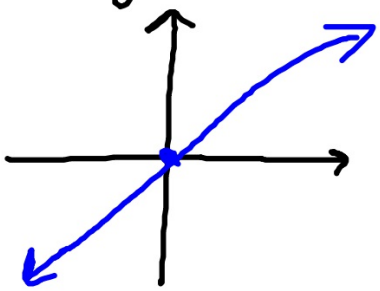
R: $\{3\}$

x-int: none

y-int: $(0,3)$ or 3

② Identity function: $f(x) = x$ or $y = x$

x	$y = x$
-2	-2
-1	-1
0	0
1	1
2	2



even/odd/neither

D: $(-\infty, \infty)$ increasing: $(-\infty, \infty)$

R: $(-\infty, \infty)$ decreasing: N/A

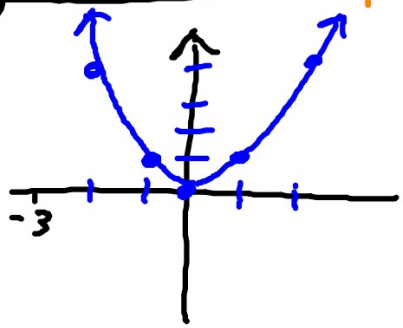
x-int: $(0, 0)$ constant: N/A

y-int: $(0, 0)$ max: N/A

Symmetry: origin min: N/A

③ Squaring function: $f(x) = x^2$ or $y = x^2$

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



even/odd/neither

D: $(-\infty, \infty)$

R: $[0, \infty)$

x-int: (0,0)

y-int: (0,0)

Symmetry: y axis

Increasing $(0, \infty)$

Decreasing $(-\infty, 0)$

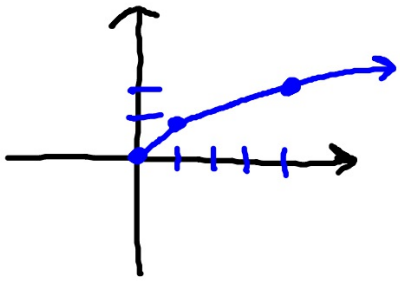
constant N/A

max N/A

min 0

④ Square root function: $f(x) = \sqrt{x}$

x	$y = \sqrt{x}$
-2	N.R.N
-1	—
0	0
1	1
2	$\sqrt{2} \approx 1.41$
4	2



D: $[0, \infty)$

R: $[0, \infty)$

x-int: $(0, 0)$

y-int: $(0, 0)$

Symmetry: NONE

even / odd / neither

Inc: $[0, \infty)$

Dec: NONE

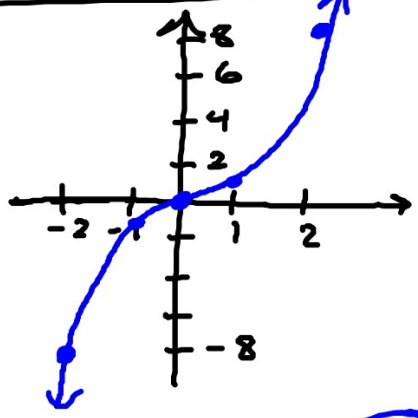
Const: N/A

max: N/A

min: 0

⑤ Cube function: $f(x) = x^3$

x	$y = x^3$
-2	-8
-1	-1
0	0
1	1
2	8



D: $(-\infty, \infty)$

R: $(-\infty, \infty)$

x-int: $(0, 0)$

y-int: $(0, 0)$

Sym: origin

even / odd / neither

Inc: $(-\infty, \infty)$

Dec: none

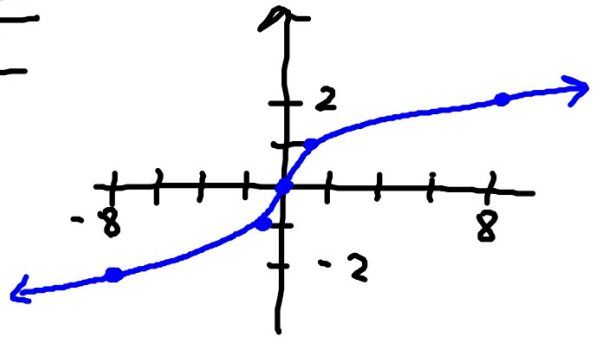
Const: none

max: none

min: none

⑥ Cube root function: $f(x) = \sqrt[3]{x}$

x	$y = \sqrt[3]{x}$
-8	-2
-1	-1
0	0
1	1
8	2



D: $(-\infty, \infty)$

R: $(-\infty, \infty)$

x-int: $(0,0)$

y-int: $(0,0)$

Sym: origin

even / odd / neither

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

dec: none

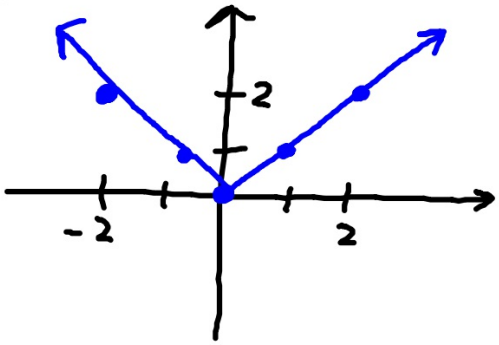
constant: none

max: none

min: none.

(7) Absolute value function: $f(x) = |x|$

x	y = |x|
-2	2
-1	1
0	0
1	1
2	2



even/odd/neither even

D: $(-\infty, \infty)$

R: $[0, \infty)$

x-int: $(0, 0)$

y-int: $(0, 0)$

Sym: y-axis

Inc: $(0, \infty)$

Dec: $(-\infty, 0)$

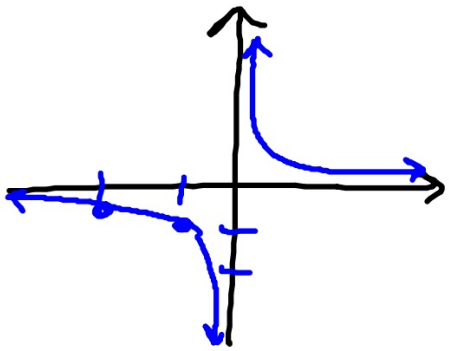
constant: none

max none

min 0

(8) Reciprocal Function: $f(x) = \frac{1}{x}$

x	y
-2	$-\frac{1}{2}$
-1	-1
0	und
1	1
2	$\frac{1}{2}$



D: $(-\infty, 0) \cup (0, \infty)$

R: $(-\infty, 0) \cup (0, \infty)$

x-int: none

y-int: none

Sym: origin

even / odd / neither

inc: none

dec: $(-\infty, 0) \cup (0, \infty)$

constant: none

max none

min none