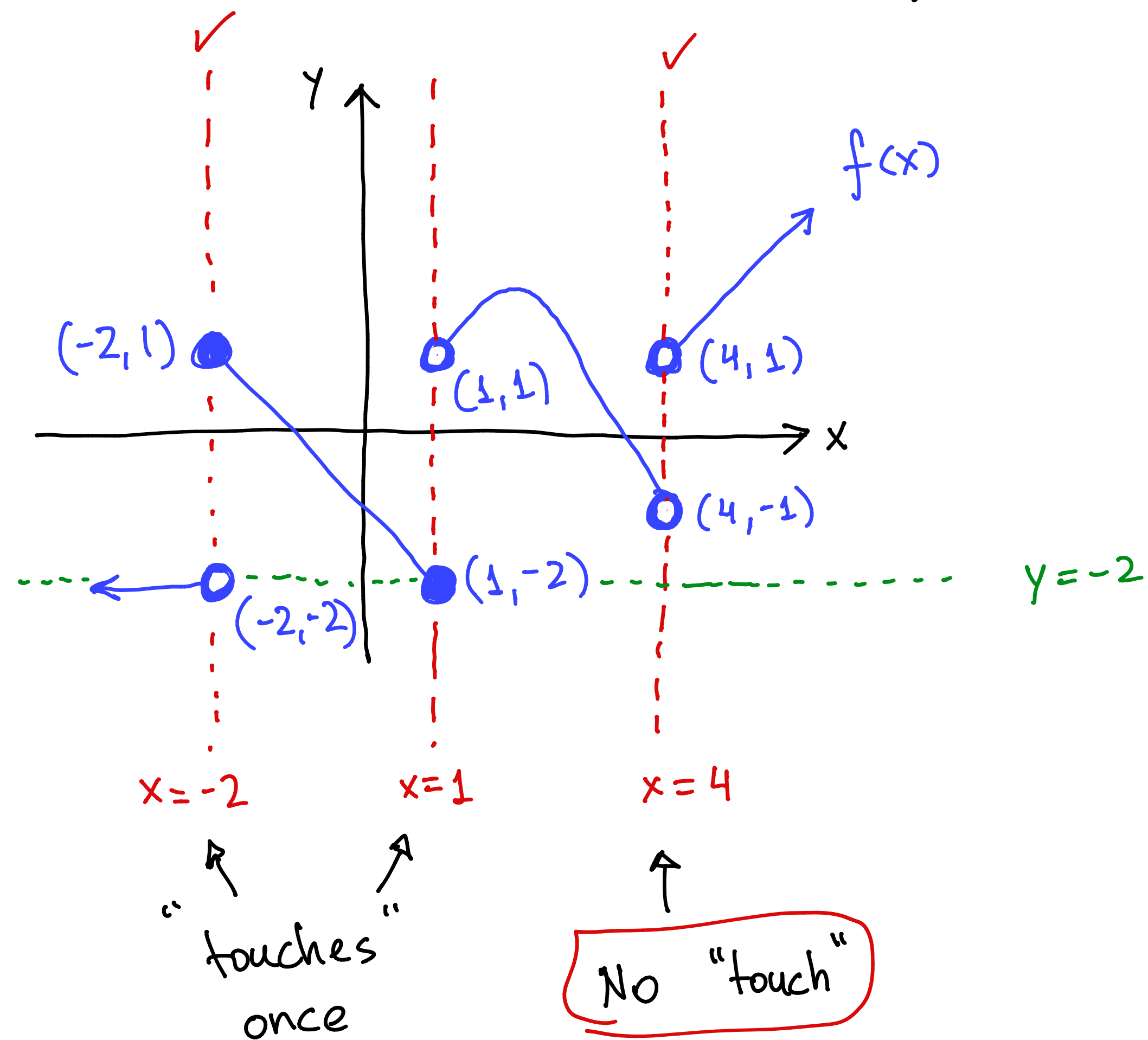


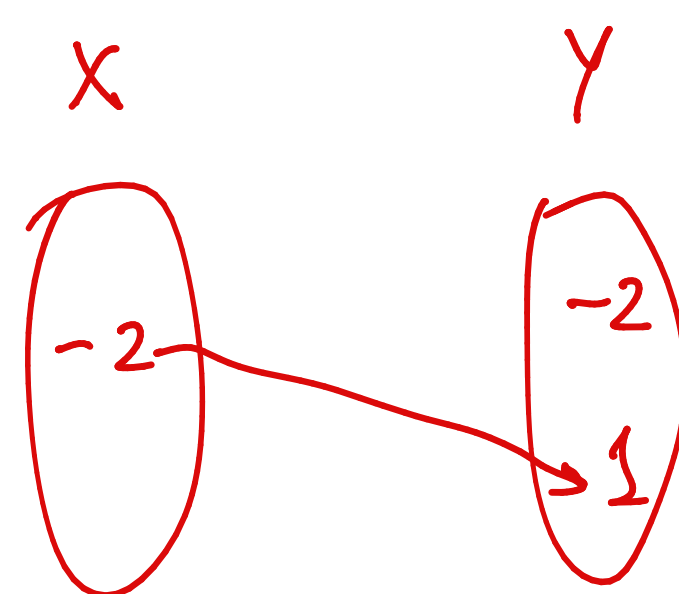
Class 10 - § 3.3 Basic Functions

Review:

→ Function vs. NOT a function:



the vertical line test

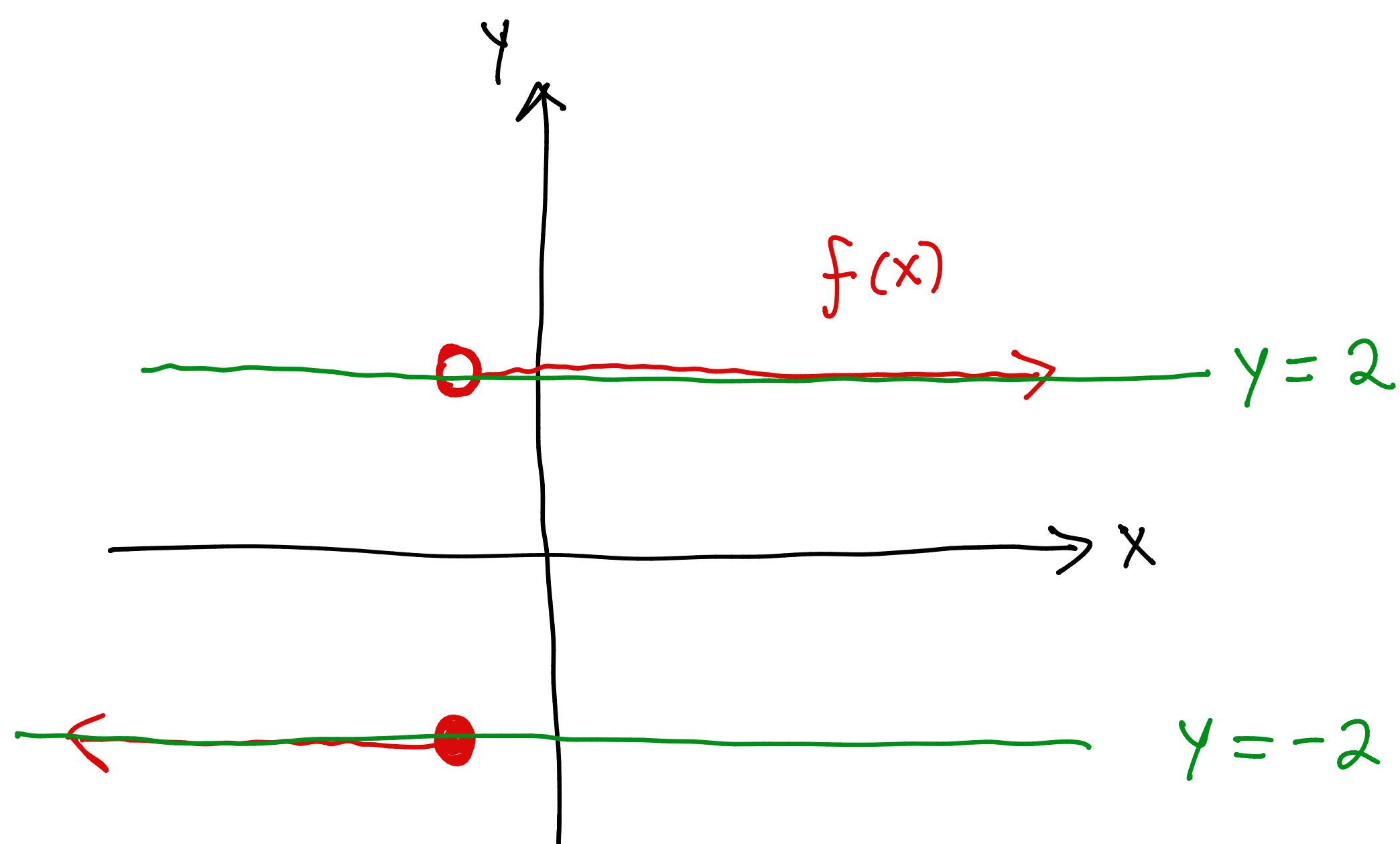


→ Domain & Range:

Domain: $(-\infty, 4) \cup (4, \infty)$

Range: $[-2, \infty)$

Exercise: determine the domain and range of the following function:



Domain: $(-\infty, -1] \cup (-1, \infty) = (-\infty, \infty)$

all #'s less than or equal to -1

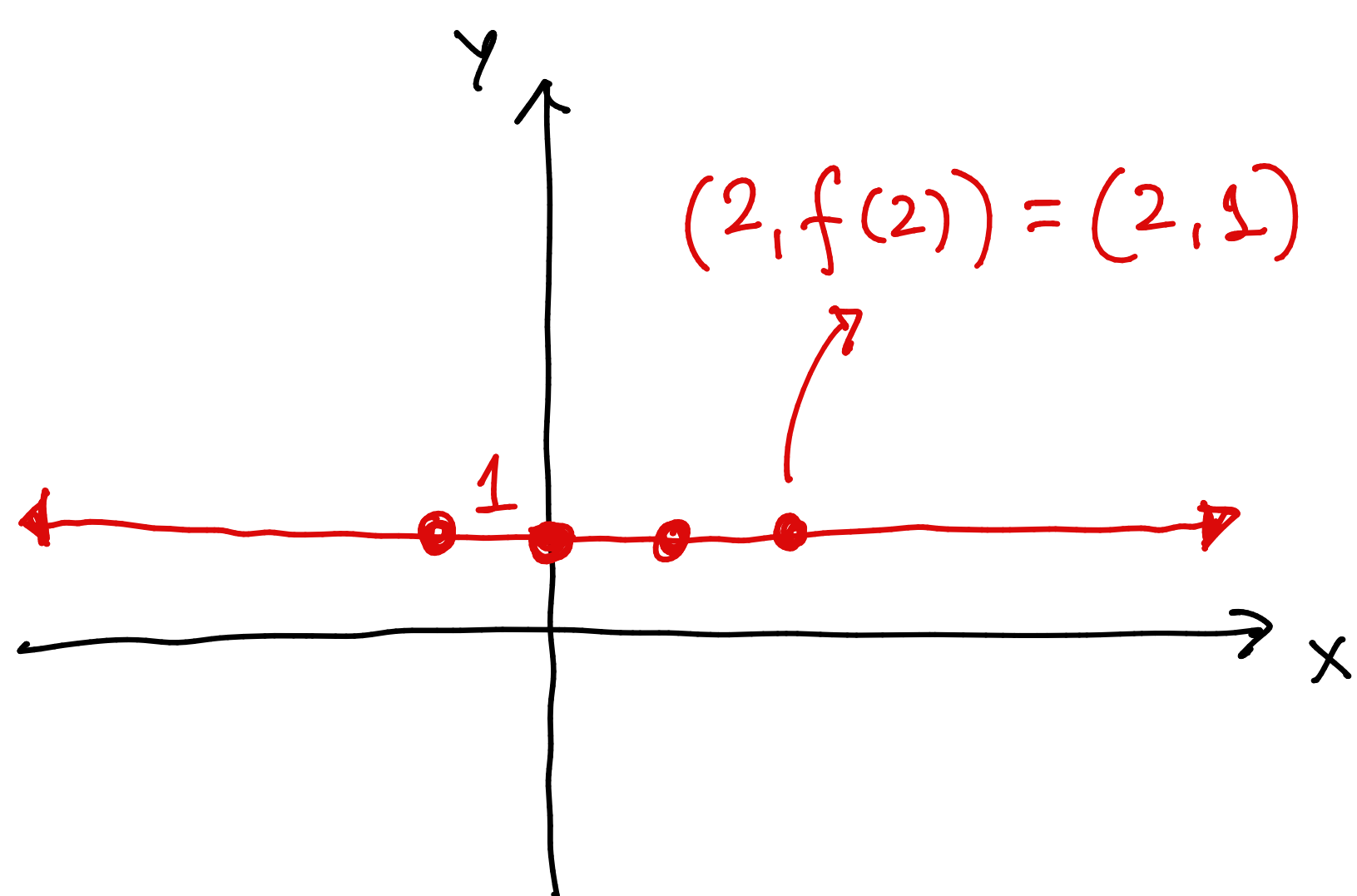
all #'s greater than -1

Range: $\{-2, 2\}$

BASIC FUNCTIONS

① Constant function: $f(x) = 1$

$$f(-1) = 1, f(0) = 1, f(1) = 1, \dots$$

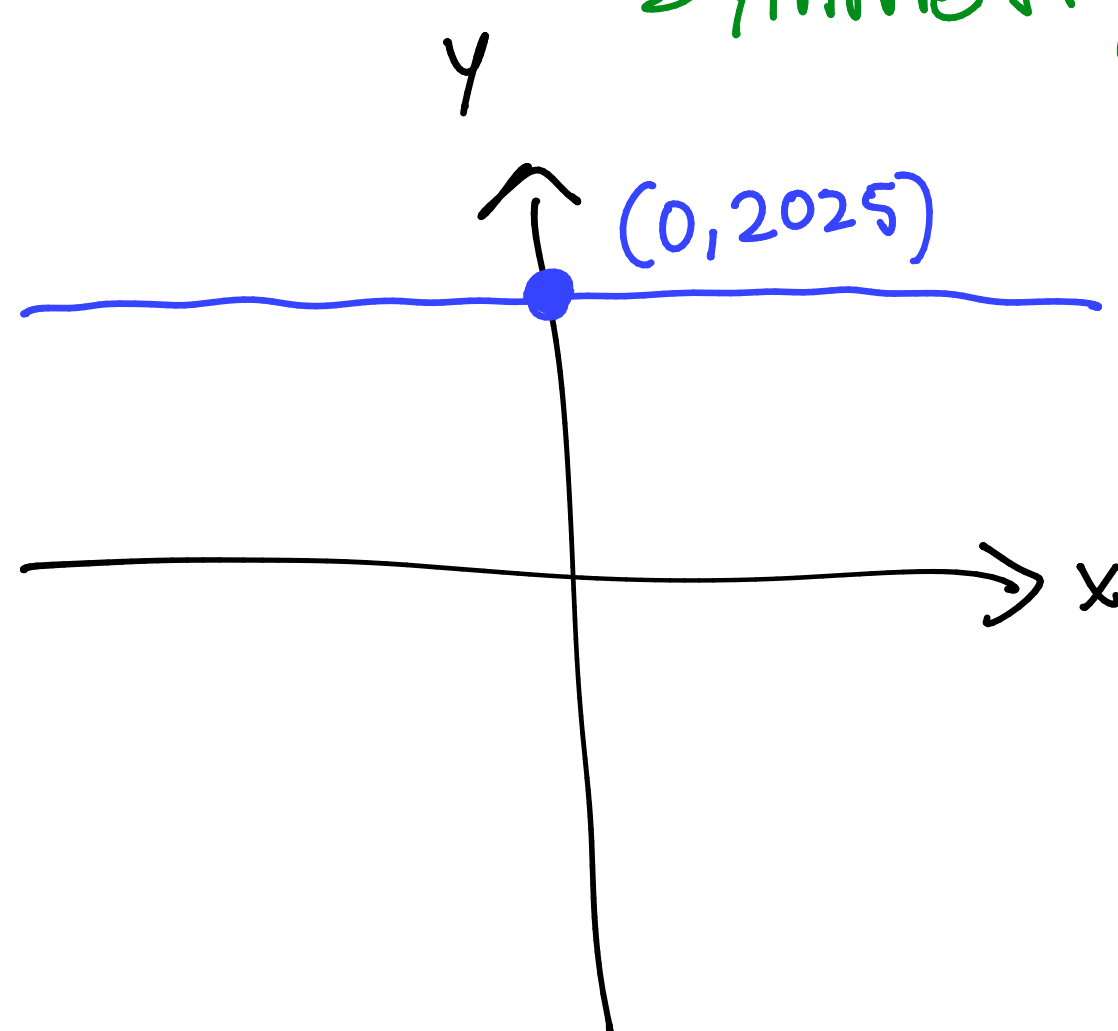


$$f(x) = 2025$$

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

Range: $\{1\}$

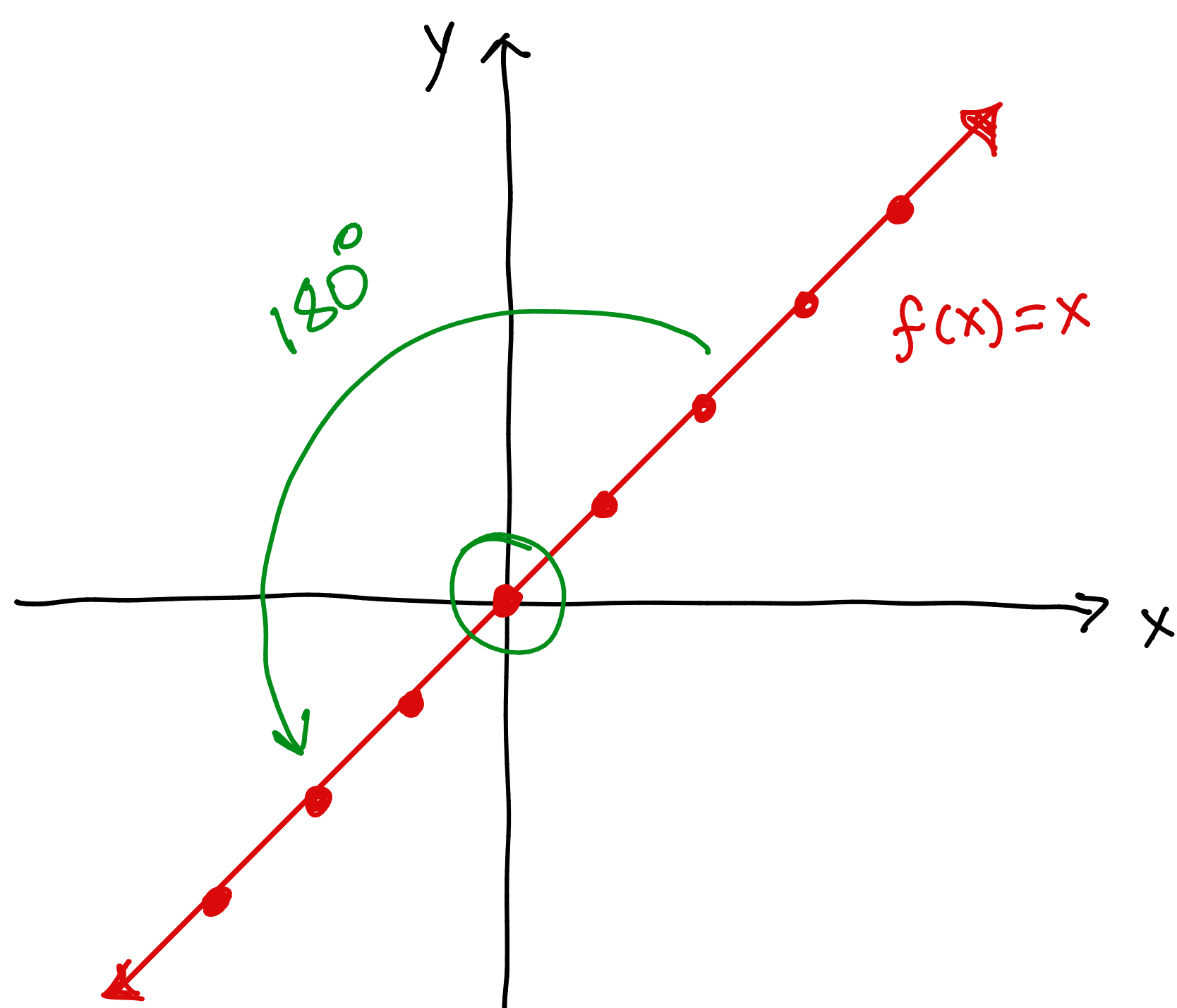
Symmetry: even



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

Range: $\{2025\}$

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



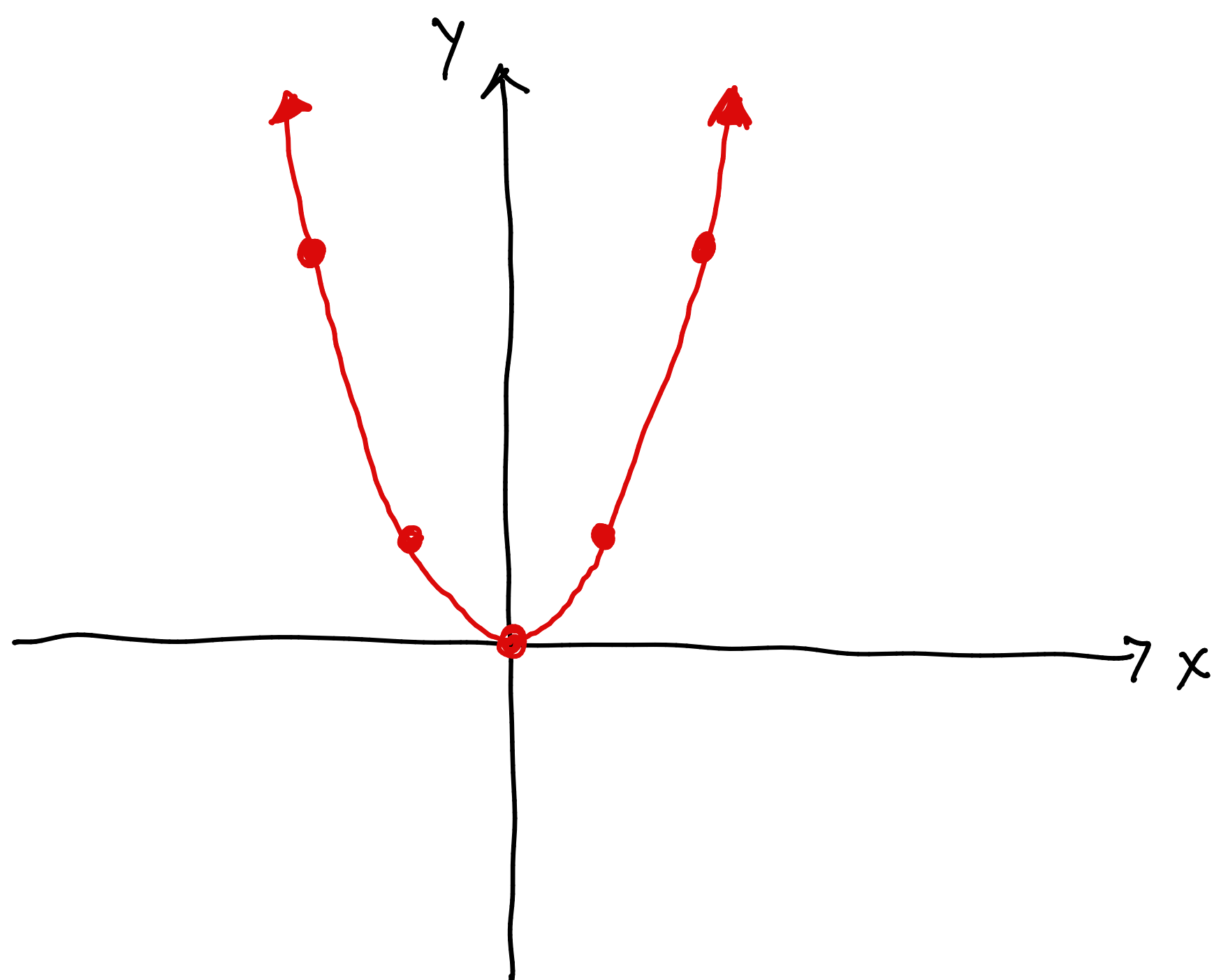
Domain: $(-\infty, \infty)$

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

Symmetry: odd

$$f(x) = x^1$$

③ Square function: $f(x) = x^2$.



x	y
0	0
-1	1
1	1
-2	4
2	4
-3	9
3	9

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

Range: $[0, \infty)$

Symmetry: even

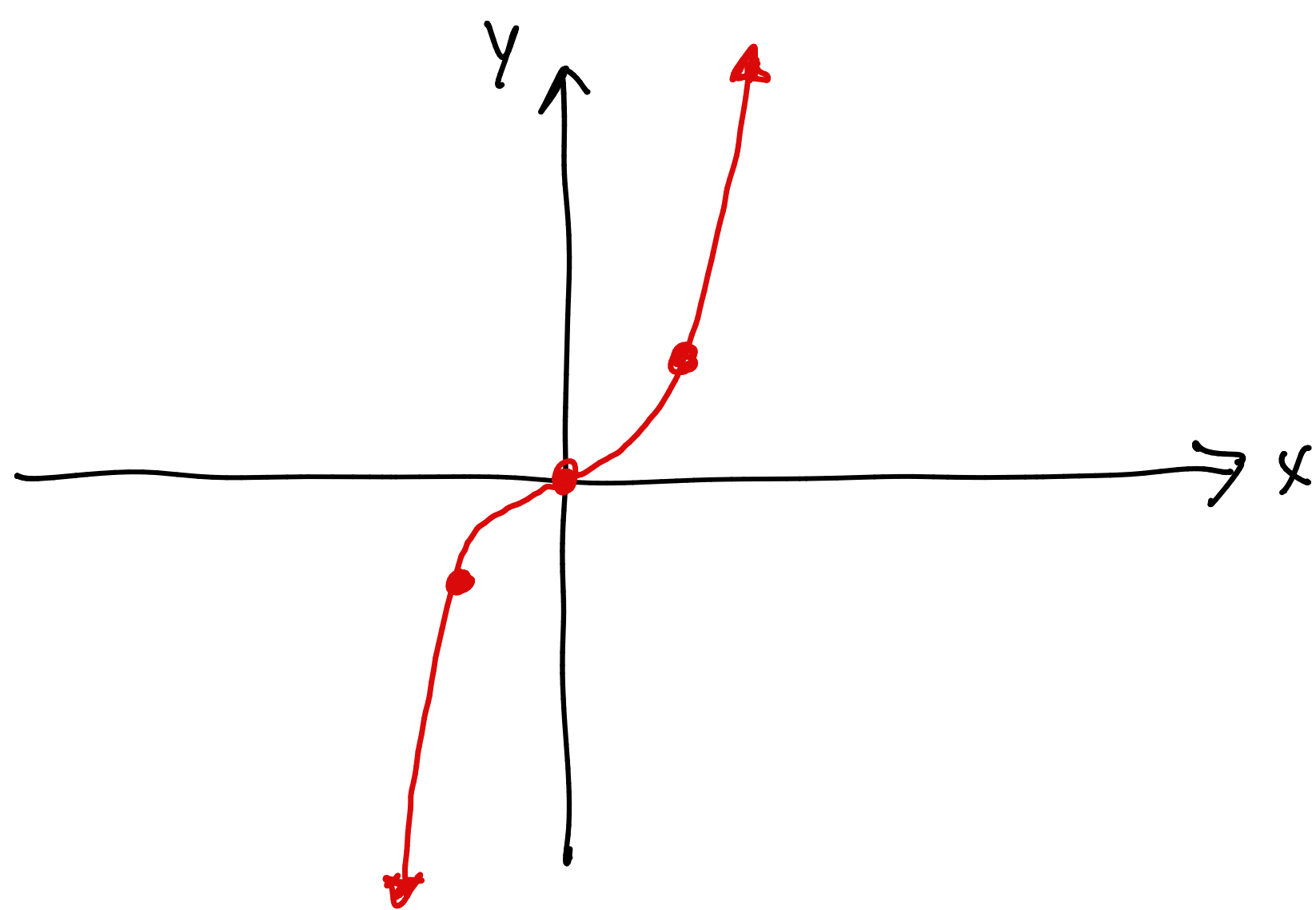
Even: $f(-x) = f(x)$ or reflection across the y-axis

Odd: $f(-x) = -f(x)$ or rotation of 180° across the origin

↑
algebraically

↑
Geometrically

④ Cubic function: $f(x) = x^3$.

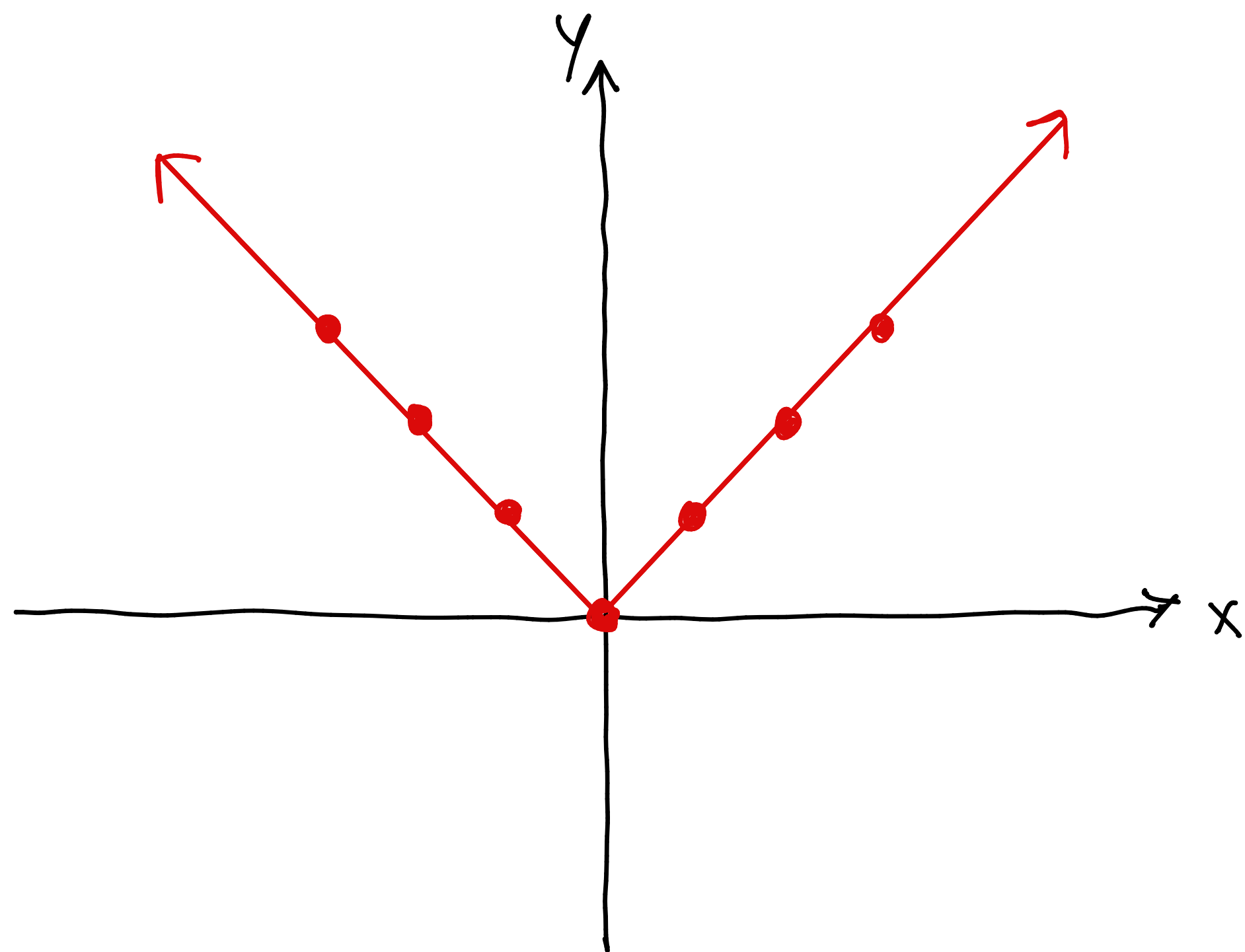


Domain: $(-\infty, \infty)$

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

Symmetry: odd

⑤ Absolute Value function: $f(x) = |x|$.

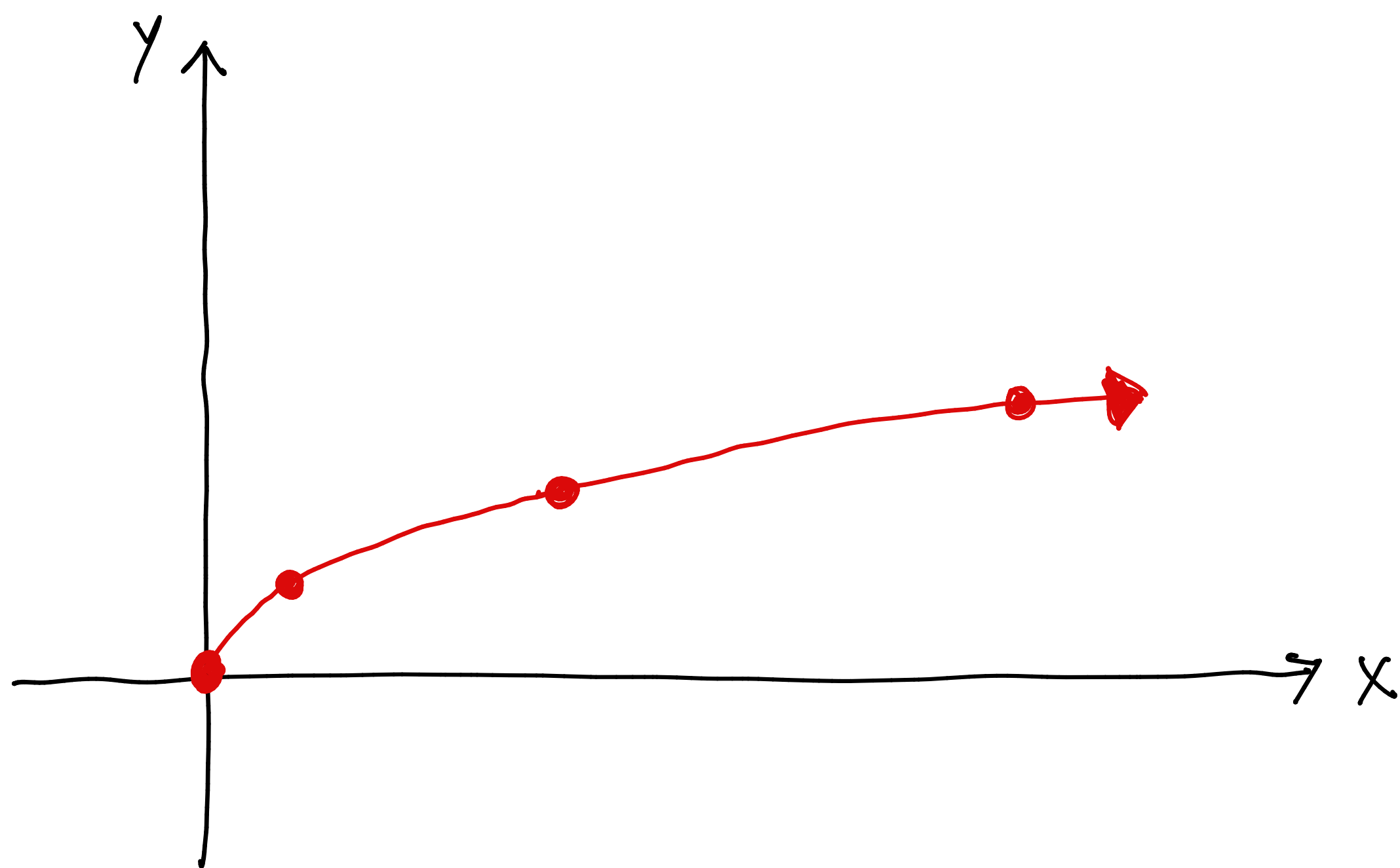


Domain: $(-\infty, \infty)$

Range: $[0, \infty)$

x	y
0	0
-1	1
1	1
-2	2
2	2
-3	3
3	3

⑥ Square Root function: $f(x) = \sqrt{x}$



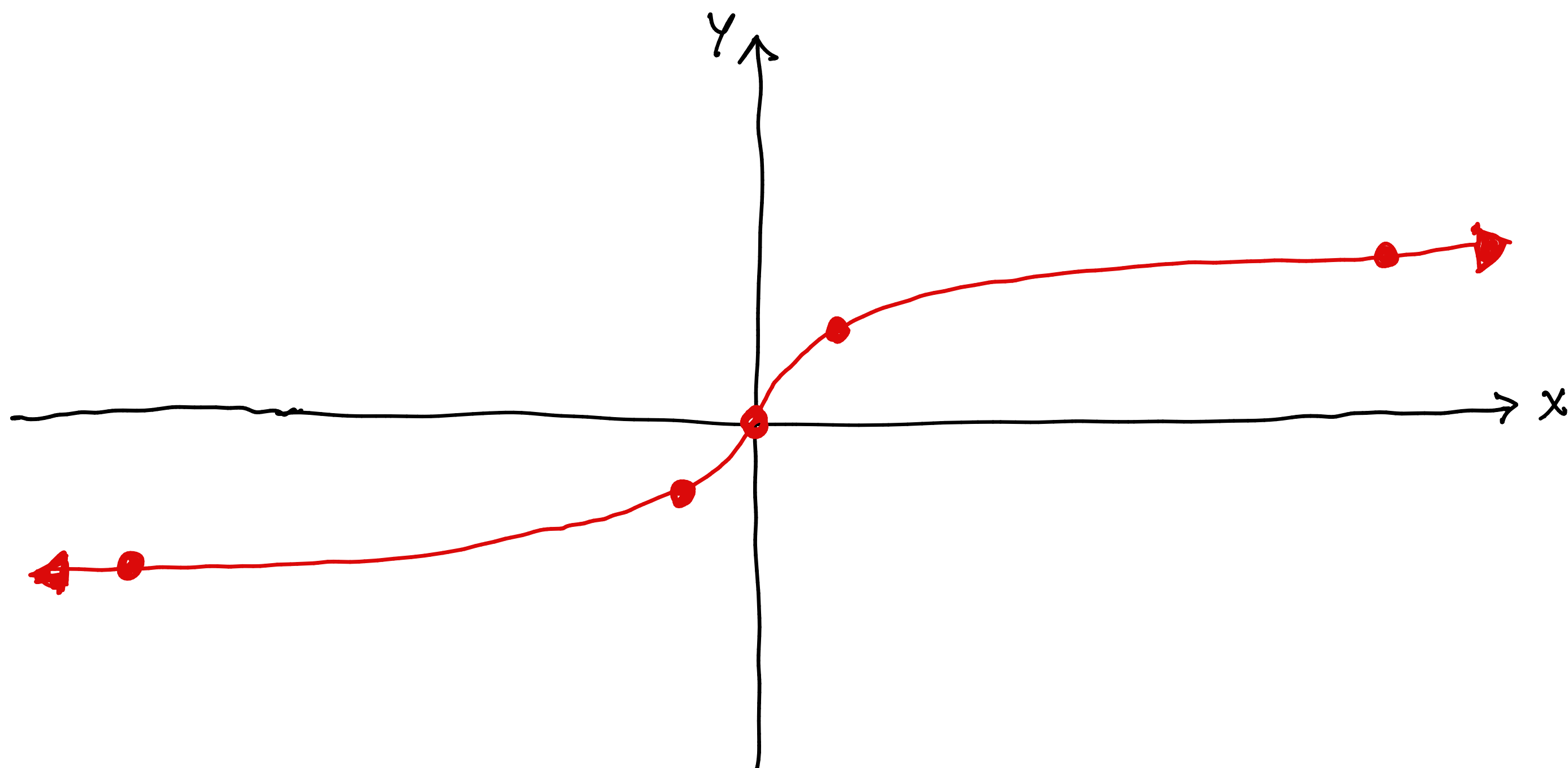
x	y
0	0
1	1
4	2
9	3

Domain: $[0, \infty)$

Range: $[0, \infty)$

⑦ Cubic Root: $f(x) = \sqrt[3]{x}$

x	y
0	0
1	1
-1	-1
8	2
-8	-2

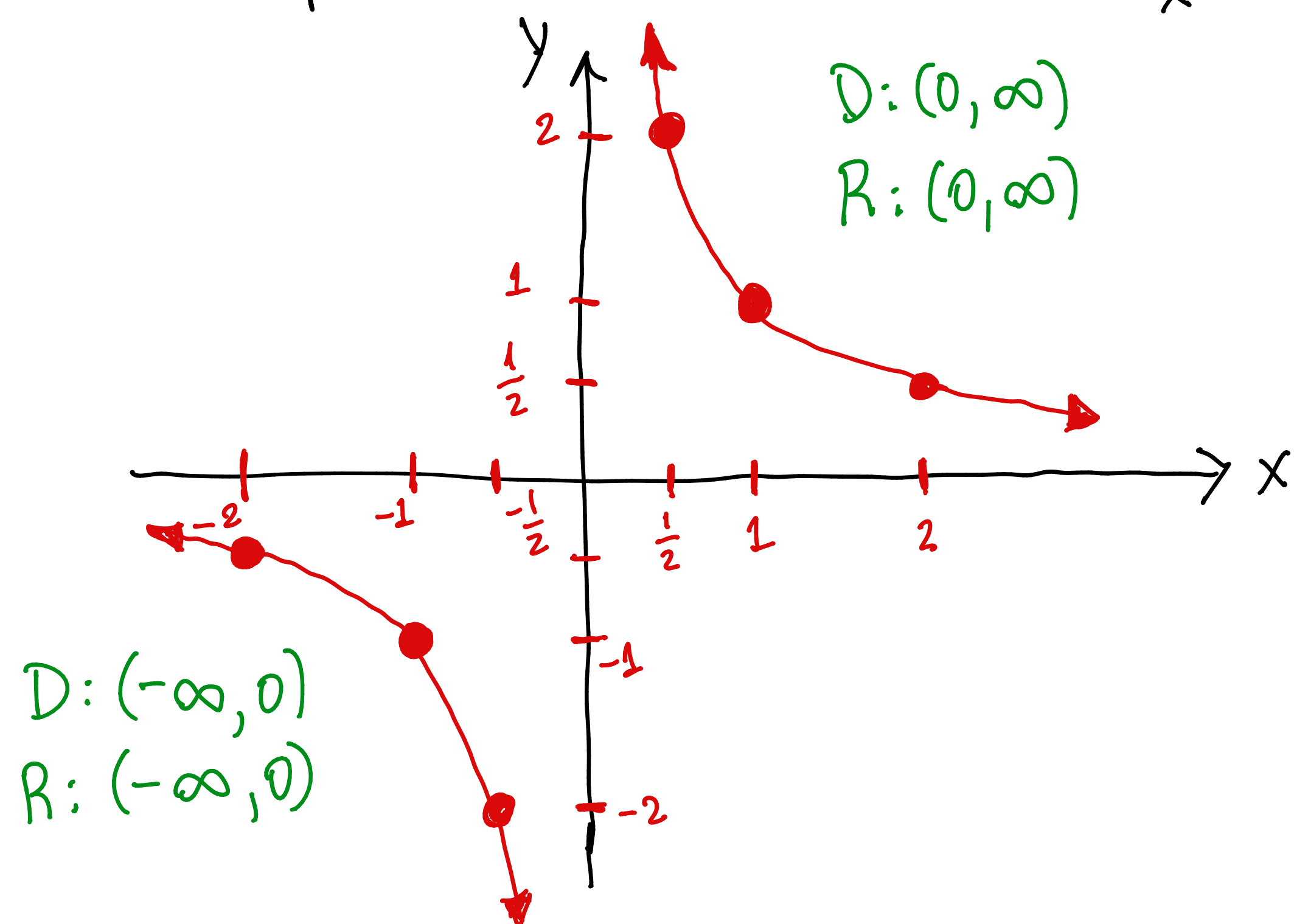


Domain: $(-\infty, \infty)$

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

Symmetry: odd

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



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

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

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

Symmetry: odd

$$f(-x) = \frac{1}{-x} = -\left(\frac{1}{x}\right) = -f(x)$$

$$f\left(-\frac{1}{2}\right) = \frac{1}{-\frac{1}{2}} = 1 \cdot -\frac{2}{1} = -2$$