Basic Graphing Review – Know these base functions and their graphs so you are able to apply transformations on them in the course.

- Label the x- and y- axis
- Make a table of values
- Plot the point on your grid
- Draw a line or smooth curve
- Domain: the set of x values valid in the equation
- Range: the set of y values valid in the equation

Use Set Notation for writing domain and range:
$\{x \mid x \in R\}$ means x is in the set of real numbers $\{x \in R\}$

$\{y \mid y \in R\}$ means y is in the set of real numbers

Use the following symbols:
$\leq$ for less than and equal to; $<$ for only less than

$\geq$ for greater than and equal to: $>$ for only greater than

$\neq$ for not equal to

When graphing, start with a table of values. Look at restrictions and use your graphing calc to verify.

1. Graph: $y = x$

input *output*

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

coordinates (x, y)
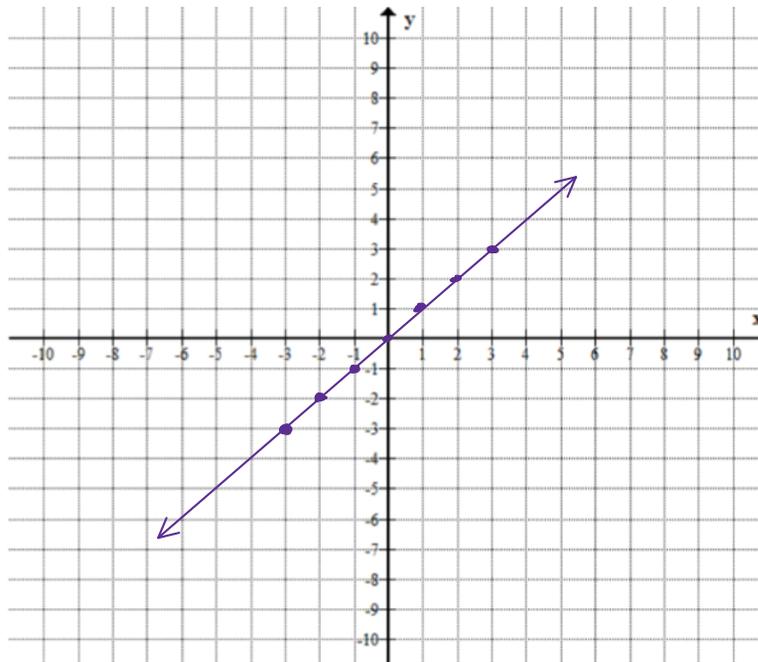
$\{x \in R\}$
$\{y \in R\}$

not in words "all real numbers"

2. Graph: $y = x^2$

← called a quadratic function → graph is a parabola

input → x output → y

| x	y
-3	9
-2	4
-1	1
0	0
1	1
2	4
3	9
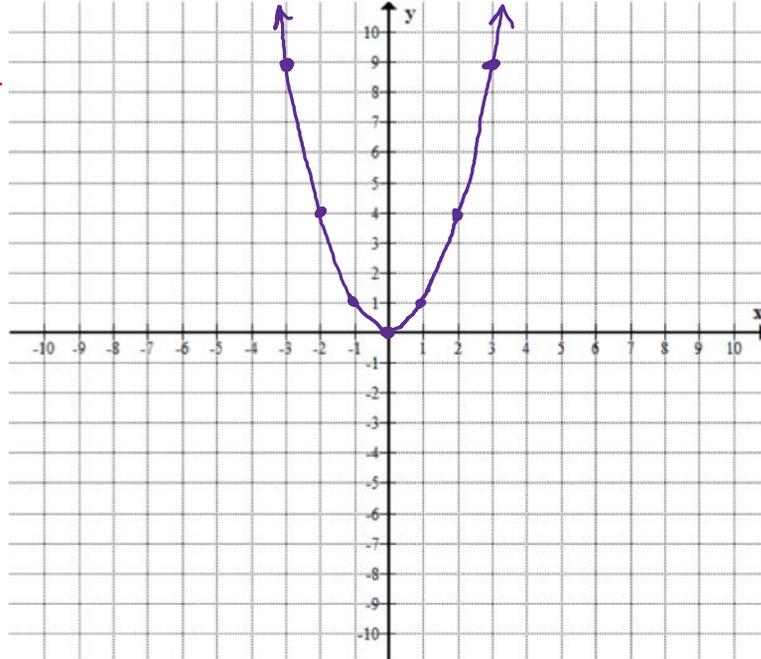
$\{x \in \mathbb{R}\}$

$\{y \geq 0, y \in \mathbb{R}\}$

OR

$\{y \geq 0\}$.

3. Graph: $y = \sqrt{x}$

← called a radical function

input → x output → y

x	y
0	0
1	1
4	2
9	3
16	4

$\{x \geq 0\}$

$\{y \geq 0\}$.

4. Graph: $y = x^3$ — input / output

$y = \sqrt[3]{x}$

x	
0	
1	
8	
27	
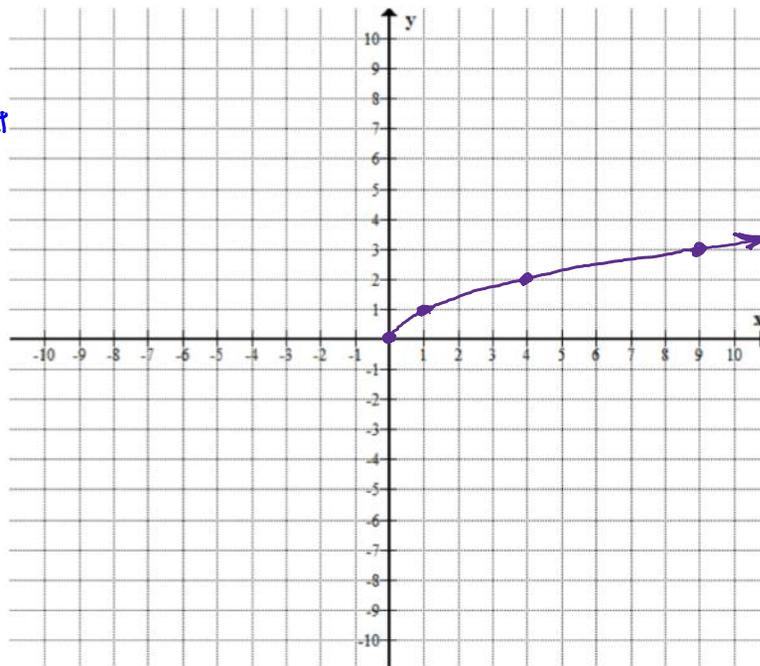
called a cubic function

x	y
-3	-27
-2	-8
-1	-1
0	0
1	1
2	8
3	27
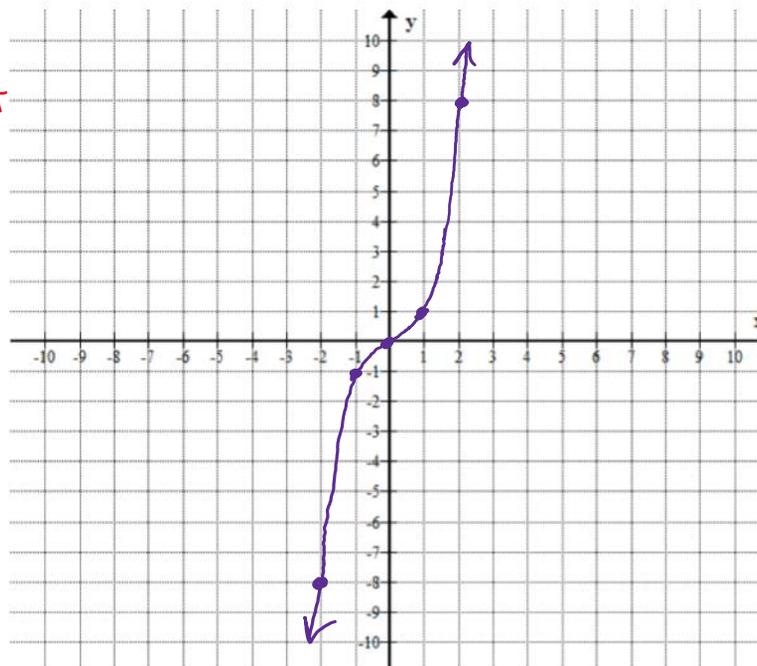
$\{x \mid x \in \mathbb{R}\}$
$\{y \mid y \in \mathbb{R}\}$

5. Graph: $y = |x|$ ← called an absolute value function

x	y
-3	3
-2	2
-1	1
0	0
1	1
2	2
3	3
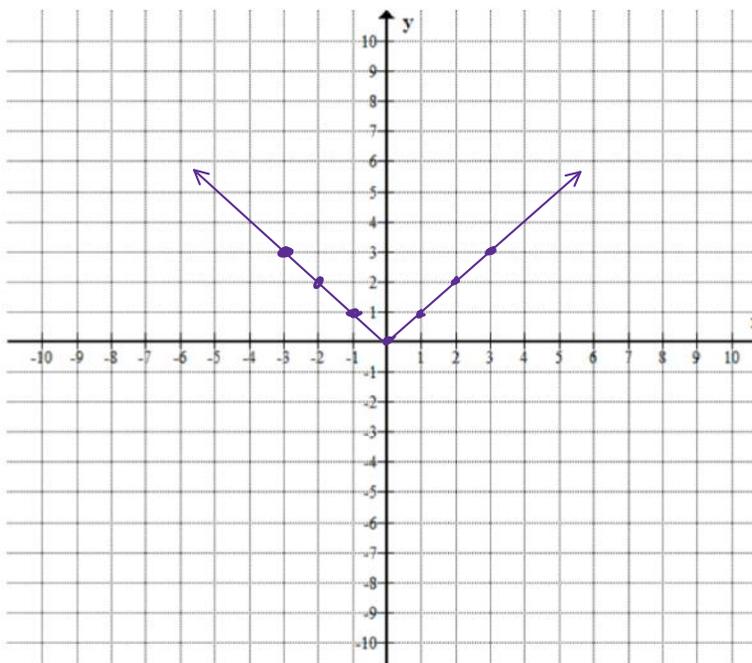
$\{x \in \mathbb{R}\}$
$\{y \geq 0\}$.

6. Graph: $y = \sqrt{25 - x^2}$ (general: $y = \sqrt{r^2 - x^2}$)

Circle: $x^2 + y^2 = r^2$
$\rightarrow \quad -x^2$
$y^2 = \sqrt{r^2 - x^2}$
$y = \pm\sqrt{r^2 - x^2}$ ◯
★ $y = \sqrt{r^2 - x^2}$ ⌒
$y = -\sqrt{r^2 - x^2}$ ⌣

$r^2 = 25$
(not r=-5) r=5

| x	y
-5	0
0	5
5	0

$\{x \mid -5 \le x \le 5\}$
$\{y \mid 0 \le y \le 5\}$

7. This is the graph of $y = f(x)$. List 4 or 5 points on this graph in the table of values.

left to right

x	y
-6.5	3
-4	0
1	-2
4	4

$y = f(x)$ represents a function which can represent any graph
+ is a relation between $x + y$

a function has one output (y-value) for one input (x-value) → vertical line test determines a function or not

not a function is more than one y-value for one x-value.
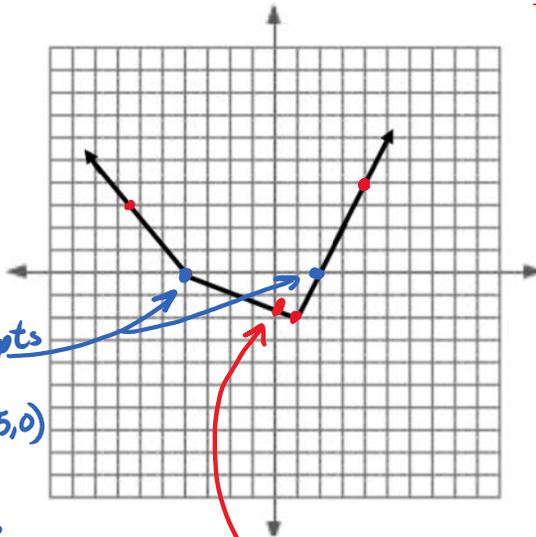
x-intercepts
= -4, 1.5
or (-4, 0) & (1.5, 0)

a.k.a.
↳ roots
↳ zeros
↳ solutions

y-intercept
= -1.5
or (0, -1.5)

$y_1 \rightarrow$
$y_2 \rightarrow$