

Mathematics 11U

1.3 – Parent Functions

1.4 –Domain and Range Part 1

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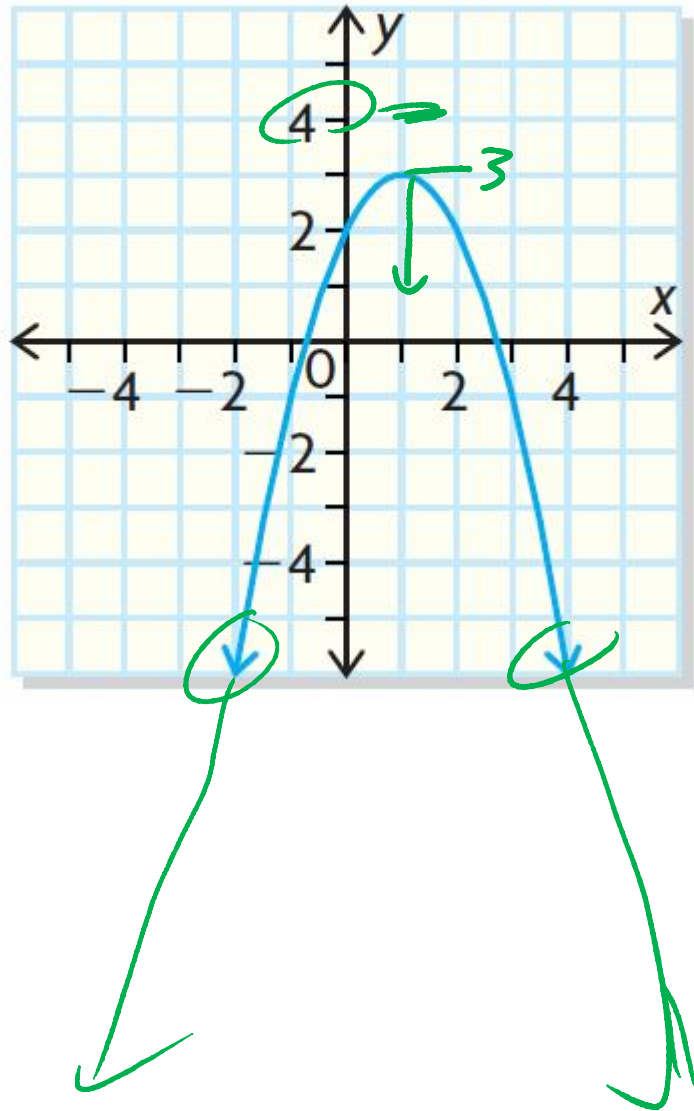
- Domain: the set of all possible x-values or inputs
 - restrictions
- Range: the set of all possible y-values or outputs
 - values that cannot be produced

Fancy Schmancy Notation

Domain: $\{x \in \mathbb{R} \mid x \geq 5\}$

The diagram illustrates the components of the set notation $\{x \in \mathbb{R} \mid x \geq 5\}$ with green arrows and handwritten text:

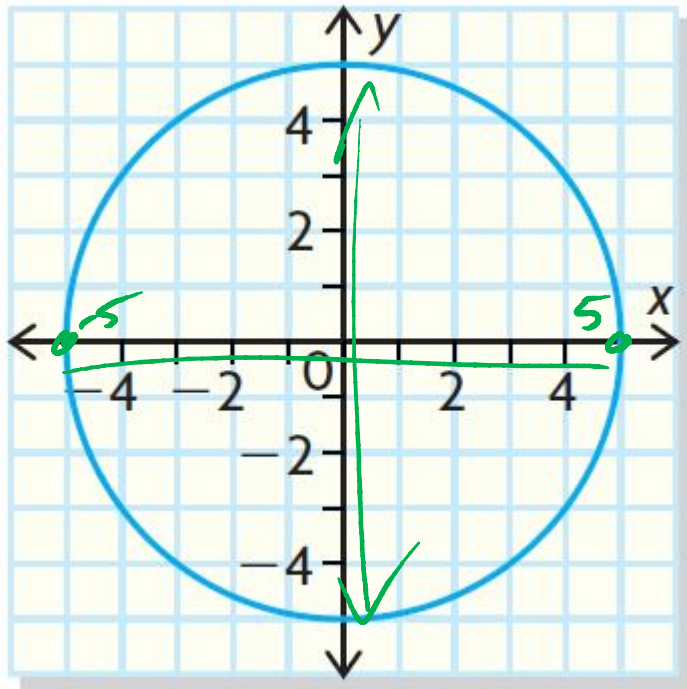
- An arrow points from the opening curly brace $\{$ to the text "the set of".
- An arrow points from the variable x to the text "belongs to".
- An arrow points from the symbol $\mathbb{R}$ to the text "real numbers".
- An arrow points from the vertical bar $|$ to the text "condition statement" and "so that, such that".



Domain: $\{x \in \mathbb{R}\}$

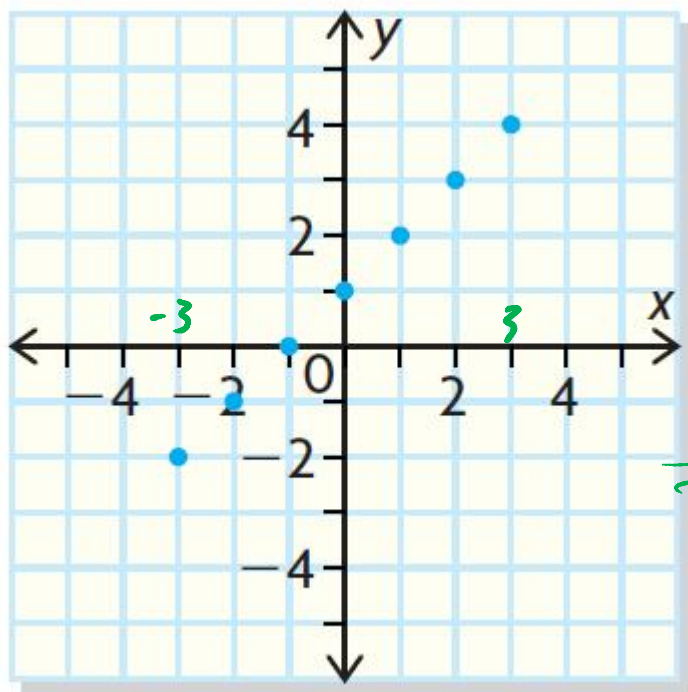
"all real numbers"

Range: $\{y \in \mathbb{R} \mid y \leq 3\}$



$$\text{Domain: } \{x \in \mathbb{R} \mid -5 \leq x \leq 5\}$$

$$\text{Range: } \{y \in \mathbb{R} \mid -5 \leq y \leq 5\}$$

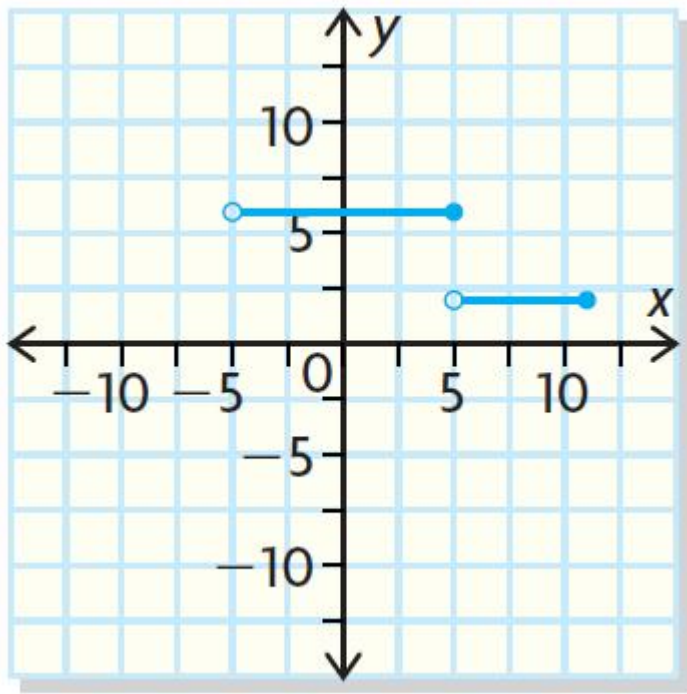


Domain $\{-3, -2, -1, 0, 1, 2, 3\}$

Range $\{-2, -1, 0, 1, 2, 3, 4\}$

Domain: $\{x \in \mathbb{Z} \mid -3 \leq x \leq 3\}$

Range: $\{y \in \mathbb{Z} \mid -2 \leq y \leq 4\}$



Domain: $\{x \in \mathbb{R} \mid -5 < x \leq 11\}$

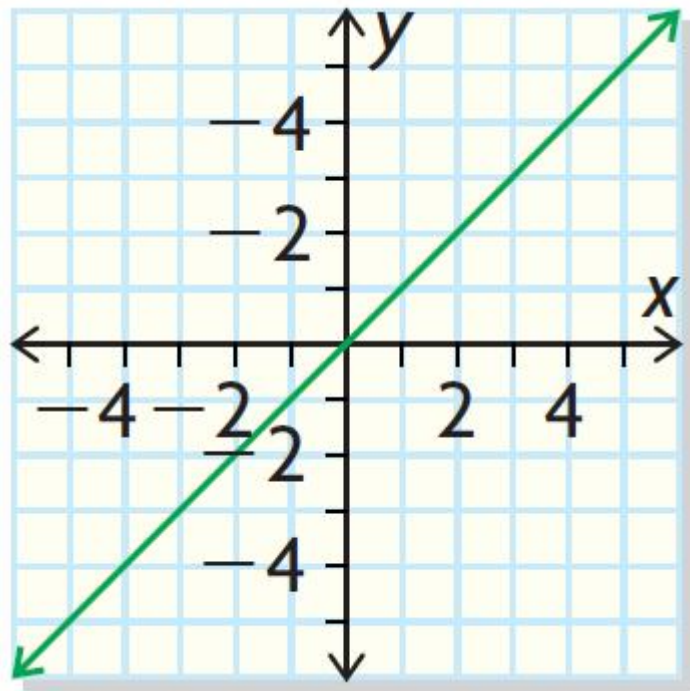
Range: $\{2, 6\}$

$\circ$ = not included or $<$ $>$

$\bullet$ = included or $\leq$ $\geq$

The 5 Parent Functions

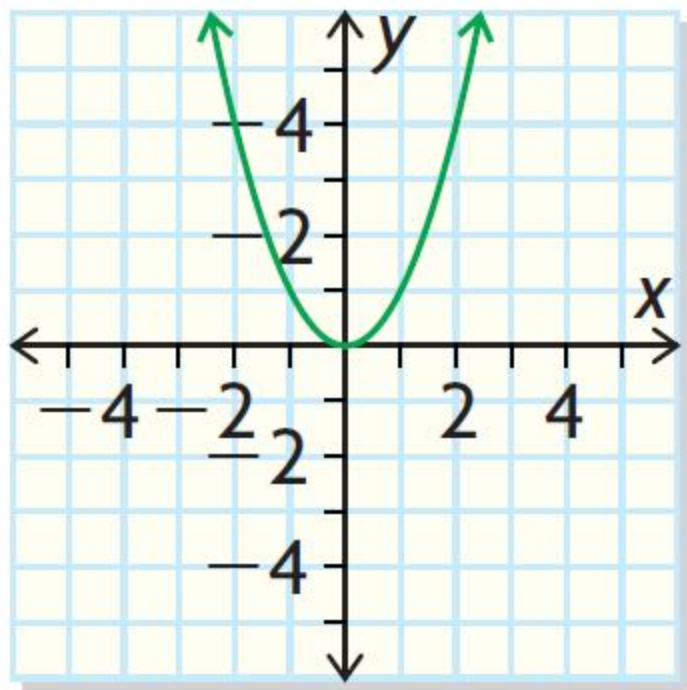
- Parent functions are the base form or stripped down version of a type of function.



1. Linear Function

$$f(x) = x$$

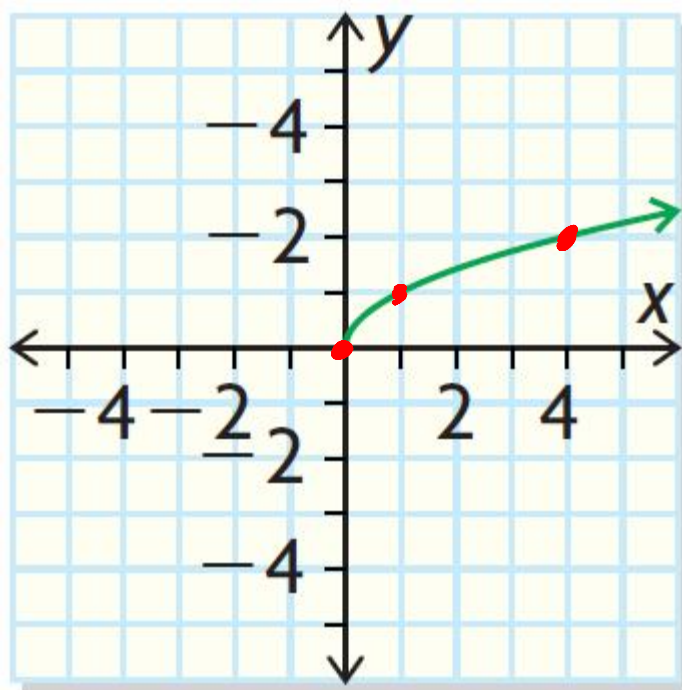
x	y
-2	-2
-1	-1
0	0
1	1
2	2



2. Quadratic Function

$$f(x) = x^2$$

x	$f(x)$
-2	4
-1	1
0	0
1	1
2	4

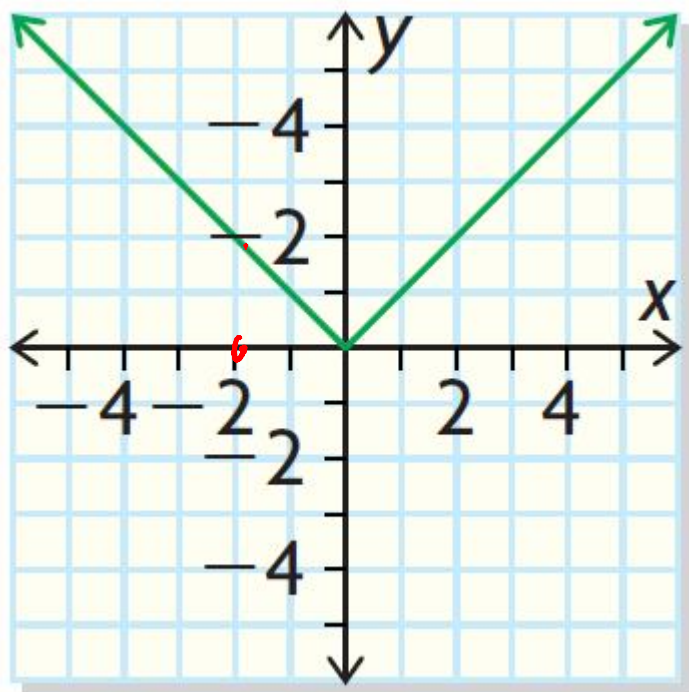


3. Square Root Function

$$f(x) = \sqrt{x}$$

- only take positive square roots.

x	$f(x)$
0	0
1	1
4	2
9	3
16	4



4. Absolute Value Function

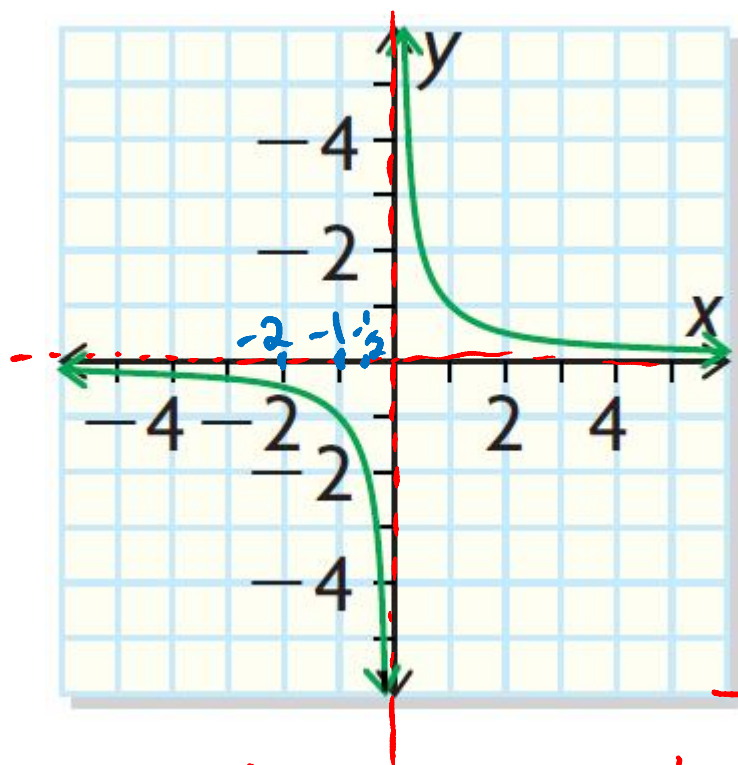
$$f(x) = |x|$$

x	$f(x)$
-2	2
-1	1
0	0
1	1
2	2

Abs Value = the distance
to zero.

$$|2| = 2$$

$$|-2| = 2$$



5. Reciprocal Function

$$f(x) = \frac{1}{x}$$

Asymptotes - a graph will continually approach and get closer to, but it will never reach it.

x	$f(x)$
-2	$-\frac{1}{2}$
-1	-1
$-\frac{1}{2}$	-2
$\frac{1}{2}$	2
0	0
$\frac{1}{2}$	$\frac{1}{2}$
2	$\frac{1}{2}$