

Chp.2 : Radical Functions + Transformations

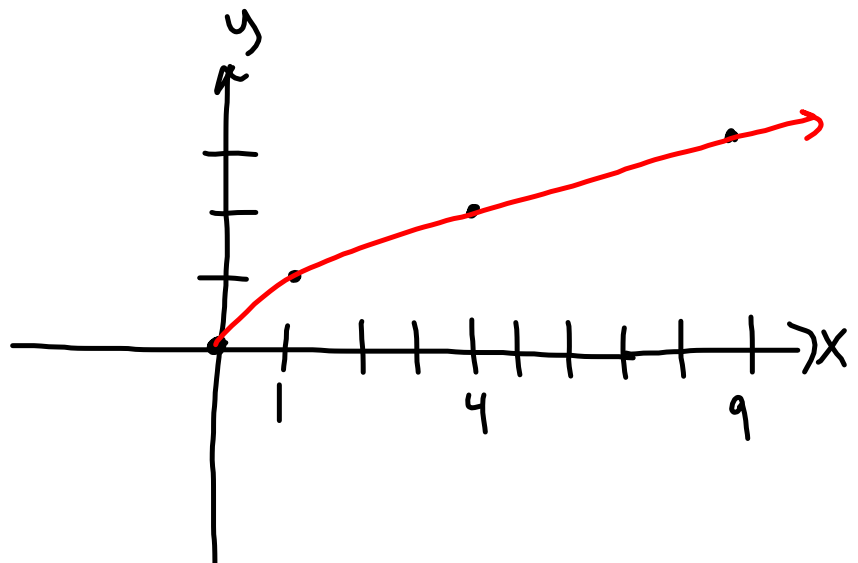
Radical Function: a function with a radical $\sqrt{\quad}$ and a variable in the radicand. exs) $y = \sqrt{2x}$

$$y = \sqrt{3(x-1)} + 9$$

Base function:

$$y = \sqrt{x}$$

x	y
0	0
1	1
4	2
9	3



Domain: $\{x \mid x \geq 0, x \in \mathbb{R}\}$

Range: $\{y \mid y \geq 0, y \in \mathbb{R}\}$

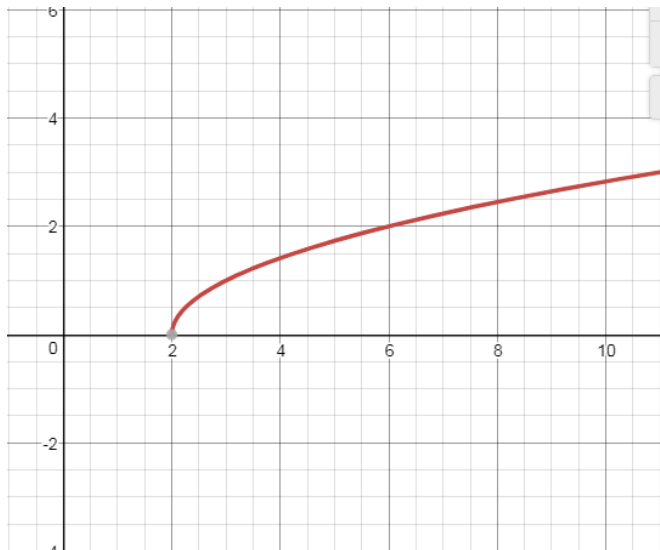
Transformation examples:

1) $y = \sqrt{x-2}$
 ↑ h. t. + 2

$(x, y) \rightarrow (x+2, y)$

\sqrt{x}	
x	y
0	0
1	1
4	2
9	3

x	y	$\sqrt{x-2}$
2	0	
3	1	
6	2	
11	3	



$D: \{x \mid x \geq 2, x \in \mathbb{R}\}$
 $R: \{y \mid y \geq 0, y \in \mathbb{R}\}$

2) $y = \sqrt{x} - 3$
 ↑ v.t of -3

$(x, y) \rightarrow (x, y - 3)$

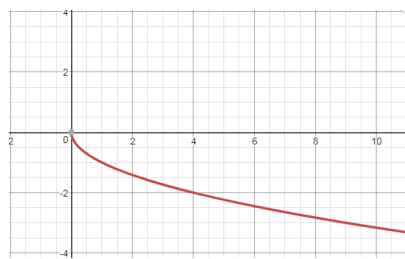
D: $\{x \mid x \geq 0, x \in \mathbb{R}\}$

R: $\{y \mid y \geq -3, y \in \mathbb{R}\}$

3) $y = -\sqrt{x}$
 ↪ reflection along the x-axis
 $(x, y) \rightarrow (x, -y)$

D: $\{x \mid x \geq 0, x \in \mathbb{R}\}$

R: $\{y \mid y \leq 0, y \in \mathbb{R}\}$

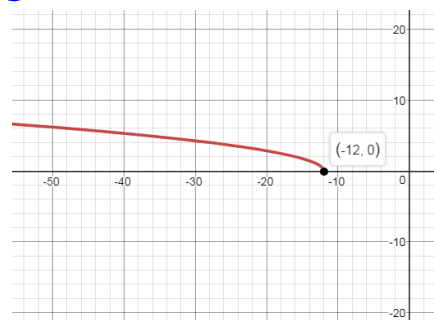


4. $y = \sqrt{-x-12}$
 $y = \sqrt{-(x+12)}$
 ↑ reflection along y-axis
 ↪ h.t of -12

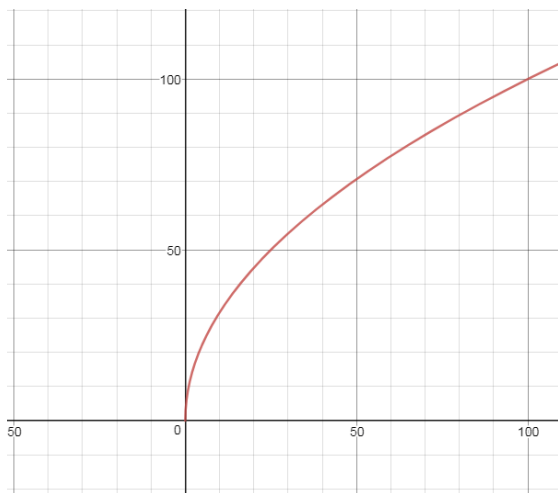
$(x, y) \rightarrow (-x-12, y)$

D: $\{x \mid x \leq -12, x \in \mathbb{R}\}$

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



5. $y = 10\sqrt{x}$
 \hookrightarrow v.s of 10
 $(x, y) \rightarrow (x, 10y)$



$D: \{x \mid x \geq 0, x \in \mathbb{R}\}$
 $R: \{y \mid y \geq 0, y \in \mathbb{R}\}$

Summary

$$y = a \sqrt{b(x-h)} + K$$

\uparrow v.s of $|a|$ \uparrow h.s of $\frac{1}{|b|}$ \uparrow h.t of h \uparrow v.t of K

Section 2.1

- | | |
|--------|--------|
| 1 c, d | 5 c, d |
| 2 c, d | 8 c, d |
| 3 | 10 b |
| 4 c, d | |