Properties of Radical Functions

These notes are intended as a summary of section 2.1 (p. 82 – 89) in your workbook. You should also read the section for more complete explanations and additional examples.

Radical Functions

A radical function has the form

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

where $f(x)$ is a function. Since we can't take the square root of a negative number, the domain of $y = \sqrt{f(x)}$ is the set of values of x for which $f(x) \geq 0$.

Graphs of Radical Functions

On p. 83 of the workbook, there are two graphs of radical functions. Take a few moments to examine these graphs and discuss.

The graphs of $y = f(x)$ and $y = \sqrt{f(x)}$ always have certain characteristics in common:

1. If 0 and 1 are in the range of $y = f(x)$, then points with these y-coordinates are on both graphs. These are known as **invariant points**.

2. Where the graph of $y = f(x)$ is between the line $y = 1$ and the x-axis, the graph of $y = \sqrt{f(x)}$ is above the graph of $y = f(x)$.

3. Where the graph of $y = f(x)$ is above the line $y = 1$, the graph of $y = \sqrt{f(x)}$ is below the graph of $y = f(x)$.

4. Where the graph of $y = f(x)$ is below the x-axis, the graph $y = \sqrt{f(x)}$ does not exist.

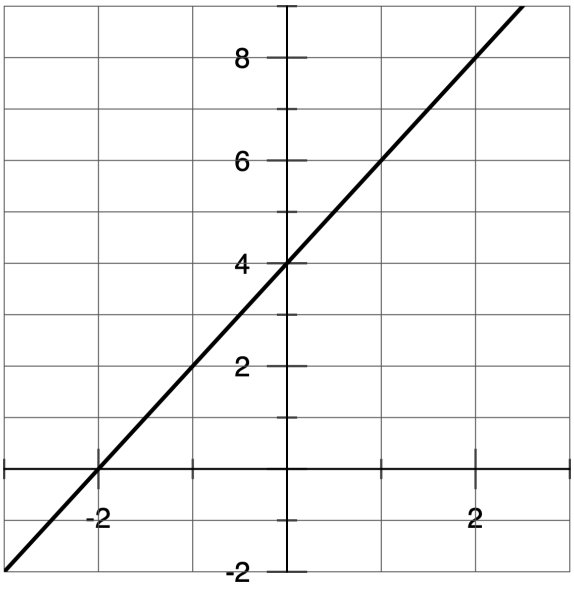
These characteristics can be used to sketch a graph of $y = \sqrt{f(x)}$ when the graph of $y = f(x)$ is given.

Graphing a Radical Function Given a Linear Function

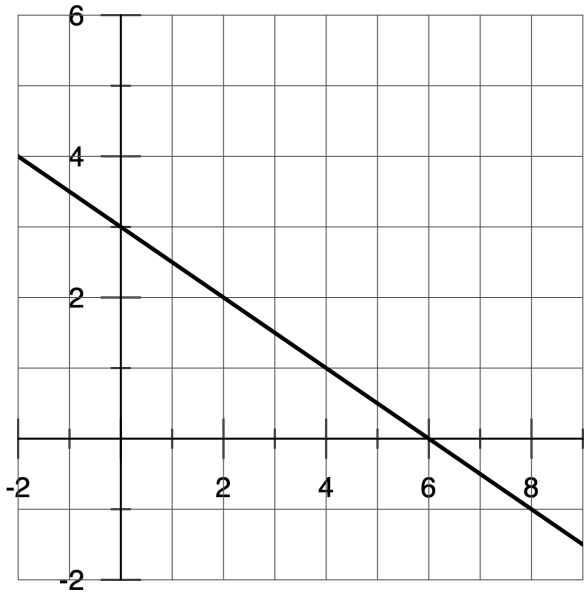
Example 1 (sidebar p. 84)
For each graph of $y = f(x)$ below:

- Sketch the graph of $y = \sqrt{f(x)}$.
- State the domain and range of $y = \sqrt{f(x)}$.

a)



b)



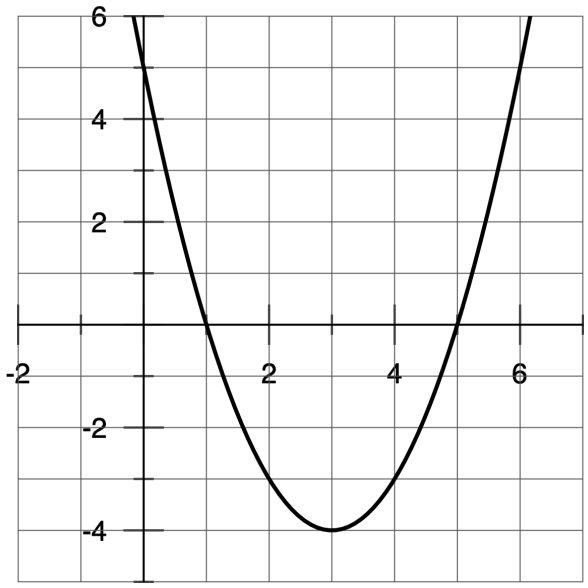
Graphing a Radical Function Given a Quadratic Function

Example 2 (sidebar p. 86)

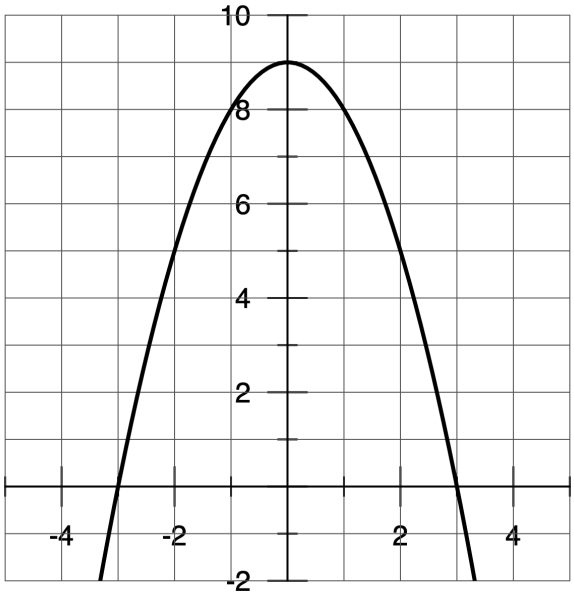
For the graph of each quadratic function $y = f(x)$ below:

- Sketch the graph of $y = \sqrt{f(x)}$.
- State the domain and range of $y = \sqrt{f(x)}$.

a)



b)

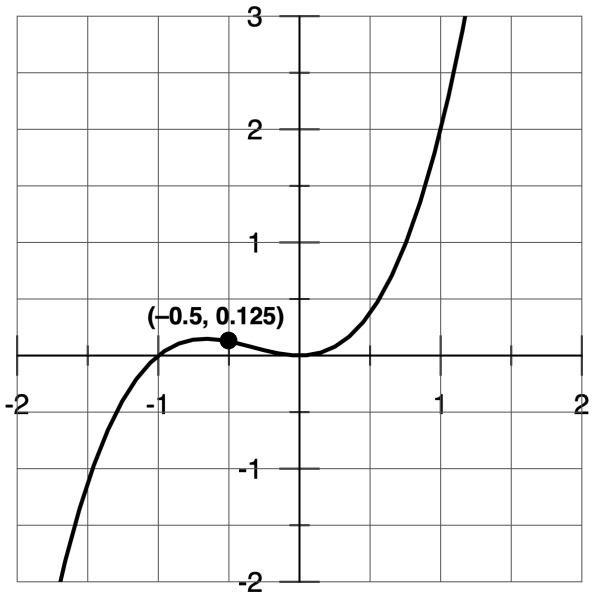


Graphing a Radical Function Given a Cubic Function

Example 3 (sidebar p. 88)

For the graph of the cubic function $y = f(x)$:

- Sketch the graph of $y = \sqrt{f(x)}$.
- State the domain and range of $y = \sqrt{f(x)}$.



Solving Radical Equations

The graphs of radical functions can be used to solve related radical equations.

Example 4 (sidebar p. 89)

Use graphing technology to solve: $\sqrt{3x+2} = -6 + x$. Give the solution to the nearest tenth.

Homework: #5, 8 – 10, 12 in the section 2.1 exercises (p. 90 – 97). Answers on p. 98.