

Function Roots

For each function:

1. Sketch $y = f(x)$.
2. Determine where $f(x) \geq 0$.
3. Sketch $y = \sqrt{f(x)}$.
4. Determine the following:
 - x-intercepts
 - y-intercept
 - domain
 - range
 - maximum or minimum

$$y = \sqrt{4x^2}$$

$$y = \sqrt{(x-2)^2 - 4}$$

$$y = \sqrt{x^2 - 3}$$

$$y = \sqrt{2(x+3)^2 + 2}$$

$$y = \sqrt{-x^2 + 7}$$

$$y = -\sqrt{-2(x+3)^2 + 7}$$

$$y = \sqrt{5 - 3x}$$

$$y = -\sqrt{3x^2 + 12x - 15}$$

1. When we take the square root of a function $y = \sqrt{f(x)}$, which values change and which stay the same: x or y ? Explain.
2. Suppose the point (a, b) is on $y = f(x)$ and $b < 0$. What happens to this point on $y = \sqrt{f(x)}$?
3. Suppose the point $(a, 1)$ is on $y = f(x)$. What happens to this point on $y = \sqrt{f(x)}$?
4. If $f(x) = 0$ at some value of x , what happens to that point on the graph of $y = \sqrt{f(x)}$?
5. If $f(x)$ is negative on an interval, what happens to the graph of $y = \sqrt{f(x)}$ on that interval?

Reflection: Answer in complete sentences.

6. What must be true about $f(x)$ for $y = \sqrt{f(x)}$ to exist?
7. What happens to the **x-intercepts** when we take the square root of a function?
8. How does the graph of $y = \sqrt{f(x)}$ compare to the graph of $y = f(x)$?

Match each equation $y = \sqrt{f(x)}$ with the corresponding graph.

then sketch in $y = f(x)$ and

determine the domain, range, x-intercepts, y-intercepts, and max/min.

$$y = \sqrt{x^2 - 9}$$

$$y = \sqrt{2x^2 - 4}$$

$$y = \sqrt{-x^2 + 9}$$

$$y = -\sqrt{2x^2 - 4}$$

$$y = -\sqrt{-x^2 + 9}$$

$$y = -2\sqrt{-x^2 - 9}$$

$$y = \sqrt{x^2 + 9}$$

