

# Find Domain and Range for Radical Functions

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

$$\begin{array}{r} x-2 \geq 0 \\ +2 \quad +2 \\ \hline x \geq 2 \end{array}$$

$$\text{Domain: } [2, \infty)$$

Range

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

① Solve for x

$$\begin{array}{c} \text{"} \\ (\sqrt{x-2})^2 = (y)^2 \\ \text{"} \end{array}$$

$$\begin{array}{r} x-2 = y^2 \\ +2 \quad +2 \\ \hline \end{array}$$

$$x = y^2 + 2$$

② Determine y restrictions

③ Test + positive y-value (1)

$$1 = \sqrt{x-2}$$

$$\begin{array}{c} (1)^2 = (\sqrt{x-2})^2 \\ \text{"} \end{array}$$

$$1 = x-2$$

$$\begin{array}{r} +2 \quad +2 \\ \hline 3 = x, x=3 \end{array}$$

$$1 = \sqrt{3-2}$$

$$1 = \sqrt{1}$$

$$1 = 1 \text{ (True)} \quad 1 \text{ is in the range.}$$

④ Test 0 y-value

$$0 = \sqrt{x-2}$$

$$\begin{array}{c} (0)^2 = (\sqrt{x-2})^2 \\ \text{"} \end{array}$$

$$0 = x-2$$

$$\begin{array}{r} +2 \quad +2 \\ \hline 2 = x, x=2 \end{array}$$

$$0 = \sqrt{2-2}$$

$$0 = \sqrt{0}$$

$$0 = 0 \text{ (True)} \quad 0 \text{ is in the range}$$

⑤ Test -1 y-value

$$-1 = \sqrt{x-2}$$

$$(-1)^2 = (\sqrt{x-2})^2$$

$$1 = x-2$$

$$\begin{array}{r} +2 \quad +2 \\ \hline 3 = x, x=3 \end{array}$$

$$-1 = \sqrt{3-2}$$

$$-1 = \sqrt{1}$$

$$-1 = 1 \text{ (False)} \quad -1 \text{ is not in the range}$$

All negative y-values will be false so the range is  $[0, \infty)$