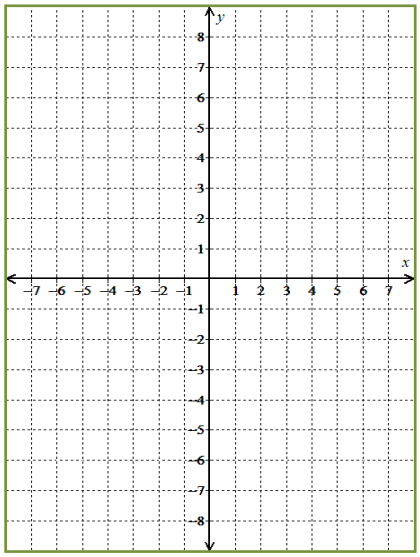
Key Concepts: Graphing Radical Functions
Solving Radical Equations

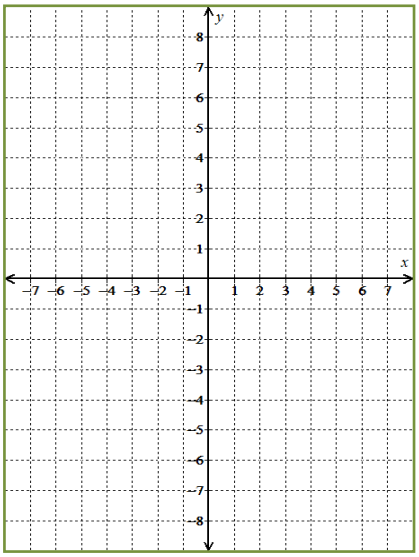
Example 1

Graph each equation on your calculator and copy the graph onto the provided grid. Then state the domain and range of the function.

Graph $y = 3\sqrt[4]{x+2} - 5$.



Graph $y = \sqrt[3]{(x-2)^2} + 1$.



Domains and Ranges of Radical Functions

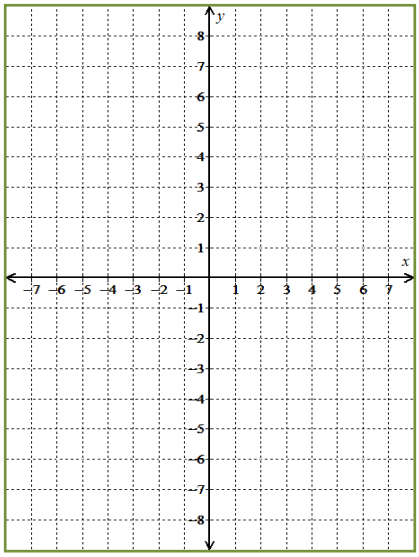
If n is an ***odd*** positive integer, then both the domain and range of $f(x) = \sqrt[n]{x}$ are $(-\infty, \infty)$.

If n is an ***even*** positive integer, then both the domain and range of $f(x) = \sqrt[n]{x}$ are $[0, \infty)$.

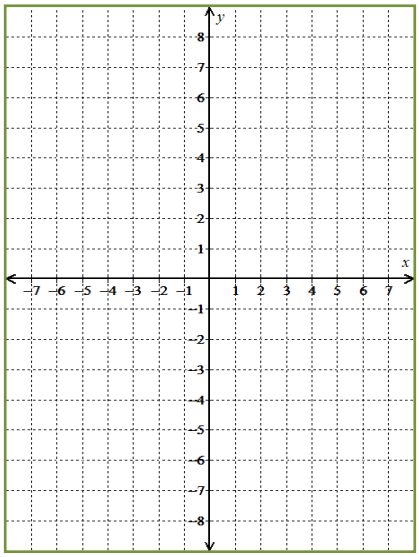
Example 2

Algebraically determine the domain of each function. Then graph each function on your calculator and copy the graph onto the provided grid. Finally, verify the domain and state the range of the function.

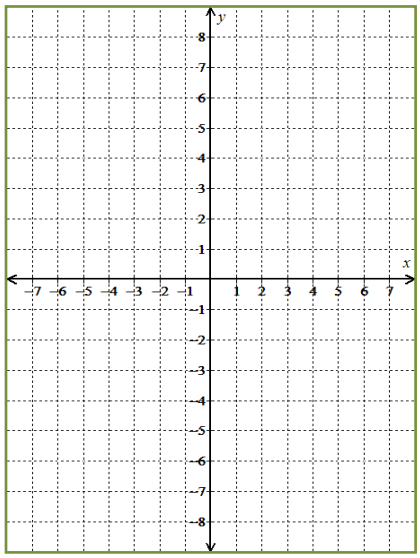
$g(x)=\sqrt{x-2}$



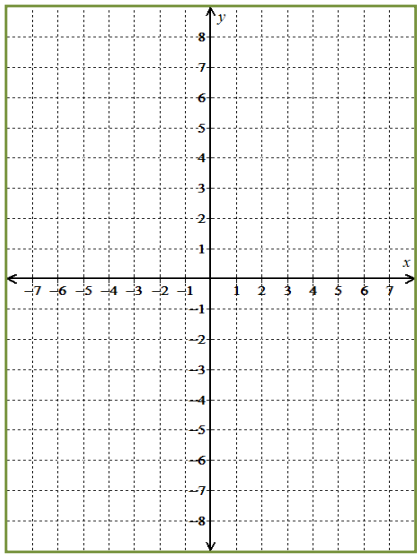
$f(x)=\sqrt{6-2x}-2$



$k(x) = \sqrt[3]{2x+6} - 2$



$p(x) = -\sqrt[4]{x+5} + 3$



Solving equations when the variable occurs in a radicand

1. Isolate the radical expression on one side of the equal sign. If there are two radicals, write them on opposite sides of the equal sign.

2. Raise both sides of the equation to the n^{th} power, where n is the index of the radical expression(s).

3. Solve the resultant equation.

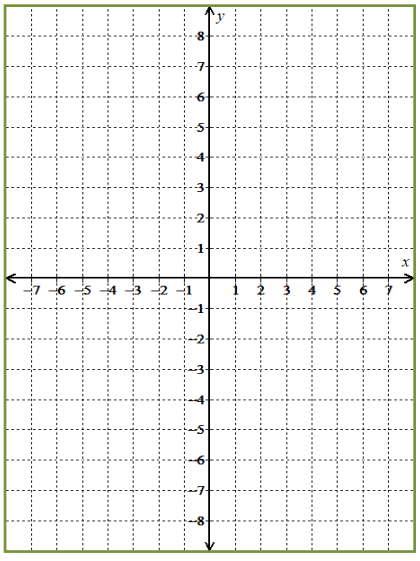
4. You ***must*** check your solutions. For example, squaring both sides of equation can introduce false solutions.

$-2 = 2$ False $\qquad$ $(-2)^2 = 2^2$ True

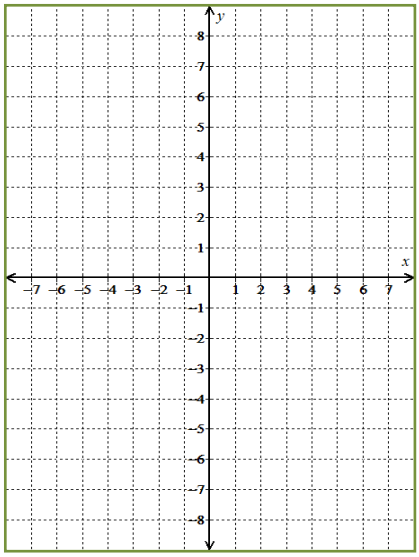
Example 3

Solve each equation and verify the solution using a graph.

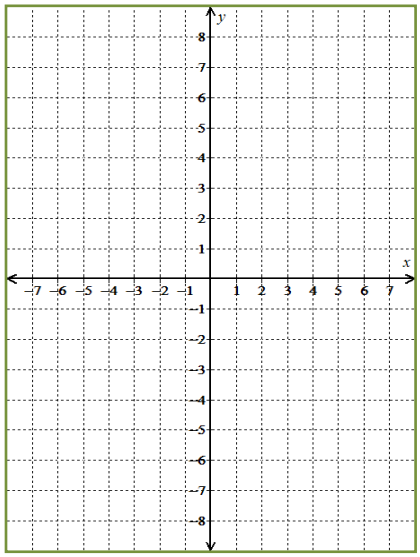
Solve $\sqrt[3]{2-t} = 4$.



Solve $\sqrt{x-5}+4=0$.



Solve $2+\sqrt{4x-3}=x$.



Solve $\sqrt{x}+\sqrt{7x+1}=11.$