

Definition: A radical equation contains \_\_\_\_\_ in the \_\_\_\_\_.

Method: The principle of powers

If  $a = b$ , then  $a^n = b^n$  for any exponent  $n$ .

Notice the “if-then” relationship here. For example, examine  $x = 3 \Rightarrow x^2 = 9$

Warning: We must check for \_\_\_\_\_

Example 1: Solve  $\sqrt{x} - 5 = 4$  (solve algebraically and graphically)

Method: To solve an equation with a radical term

- 1.) Isolate the radical term on one side of the equation.
- 2.) Use the principle of powers and solve the resulting equation.
- 3.) Check any possible solution in the original equation.

Example 2: Solve  $\sqrt{x} + 5 = 2$

Example 3:  $\sqrt{x-2} - 7 = -4$

Example 4:  $x = \sqrt{x-1} + 3$

Method: Solve an equation with two or more radical terms

- 1.) Isolate one of the radical terms.
- 2.) Use the principle of powers.
- 3.) If a radical remains, perform steps (1.) and (2.) again.
- 4.) Solve the resulting equation.
- 5.) Check possible solutions in the original equation.

Example 5: Solve

a.)  $\sqrt{x+2} + \sqrt{3x+4} = 2$

$$\text{b.) } \sqrt{6x+7} - \sqrt{3x+3} = 1$$

Example 6: For the given functions, find the values of  $t$ .

a.) If  $f(t) = \sqrt{t-2} - \sqrt{4t+1}$ , solve  $f(t) = -3$

b.) If  $g(t) = \sqrt{t} + \sqrt{t-9}$ , solve  $g(t) = 1$