Lesson 3: Relating Roots and Intercepts of Radical Functions.

Example 1:

a) Solve $\sqrt{x+5}-3=0$ algebraically.

$+3 \quad +3$

$(\sqrt{x+5})^2=(3)^2$

$x+5=9$

$-5 \quad -5$

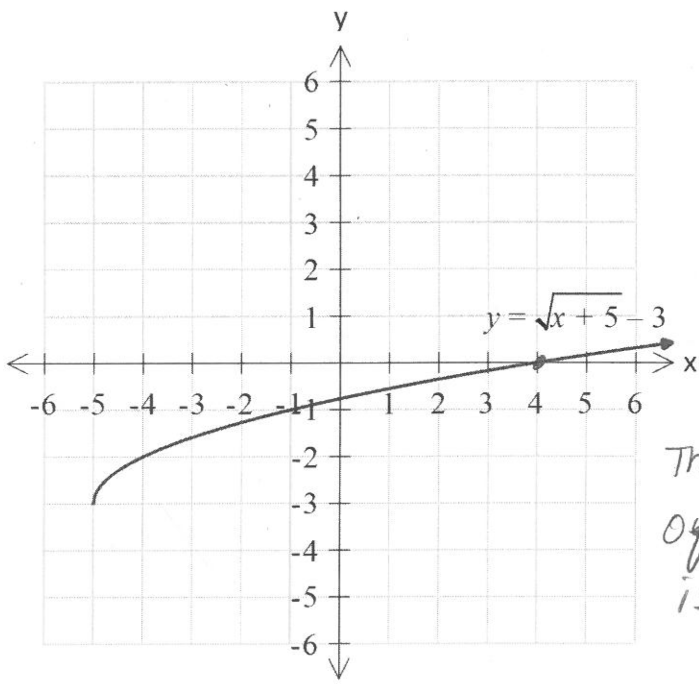
$x=4$

Therefore $x=4$ is the solution

VERIFY

LS	RS
$\sqrt{x+5}-3$	0
$\sqrt{4+5}-3$	
$\sqrt{9}-3$	
$3-3$	$LS=RS$
0	

b) Identify the x –intercept(s) of the graph of $y=\sqrt{x+5}-3$ shown below.



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

$0=\sqrt{x+5}-3$

giving us the x-intercept

$(4,0)$

The x-intercept of our graph is 4.

c) Describe the relationship between the x –intercepts of the graph and the roots of the equation that you solved in part (a).

The root of equation is the same as the x-intercept

What is the Root(s) of equation?

Root(s) of equation: the solution to an equation.

Example 2: Solve the equation $\sqrt{x+5} = x + 3$ algebraically and graphically.

Algebraically: $\left(\sqrt{x+5}\right)^2 = (x+3)^2$

To solve Quadratic Equation either use Factoring or Quadratic formula.

$x + 5 = x^2 + 6x + 9$

$0 = x^2 + 6x + 9 - x - 5$

$0 = x^2 + 5x + 4$

$0 = (x+1)(x+4)$

$x + 1 = 0$
$x = -1$

$x + 4 = 0$
$x = -4$
extraneous solution.

Therefore the solution is $x = -1$

VERIFY: $x = -1$

LS	RS
$\sqrt{-1+5}$	$-1+3$
$\sqrt{4}$	2
2	

✓ LS = RS

VERIFY $x = -4$

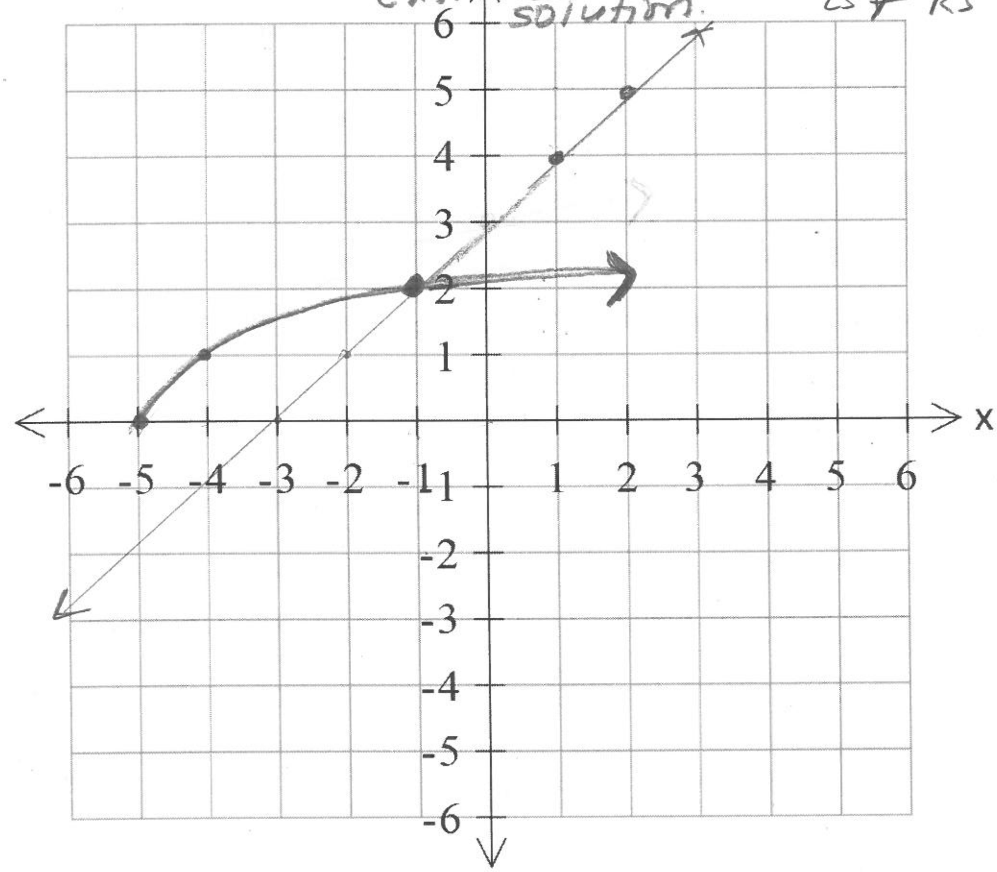
LS	RS
$\sqrt{-4+5}$	$-4+3$
1	-1

LS ≠ RS

Graphically:

$g(x) = x + 3$

$h(x) = \sqrt{x+5}$



Assignment Time! Work on p.93- 9 (add in "solve algebraically")