Lesson 3: Relating Roots and Intercepts of Radical Functions.

Example 1:

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

We have to verify the solution

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

$$x + 5 = 9$$

$$x = 9 - 5$$

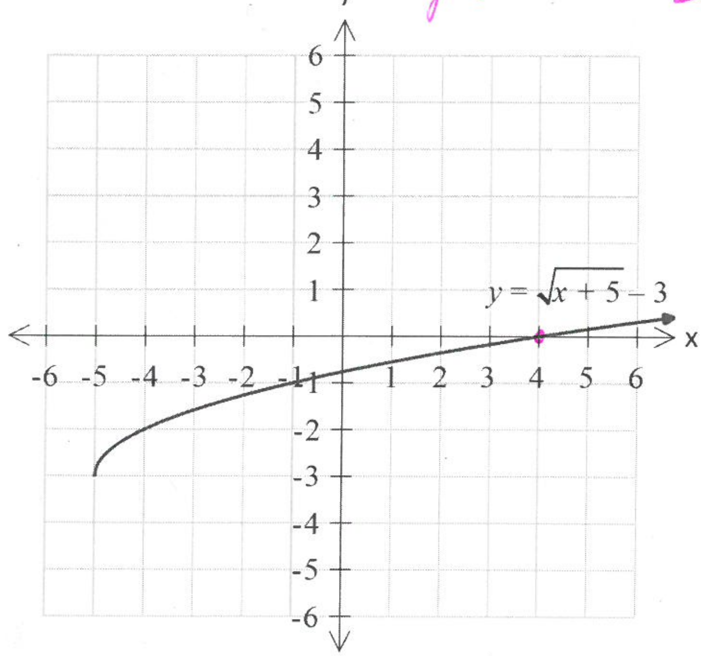
$$x = 4$$

$\therefore$ $x = 4$ is the solution

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

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

y-value is zero for x-int



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

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

x-int $= 4$

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 the equation is the same as the x-intercept of the graph.

ie we could find the x-int by solving the root of the equation.

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

Algebraically:

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

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

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

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

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

$\boxed{x=-1}$ $\boxed{x=-4}$

verify $x=-1$

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

$\boxed{x=-1 \text{ is a solution}}$

verify $x=-4$

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

$x=-4$ is not the solution
Extraneous solution.

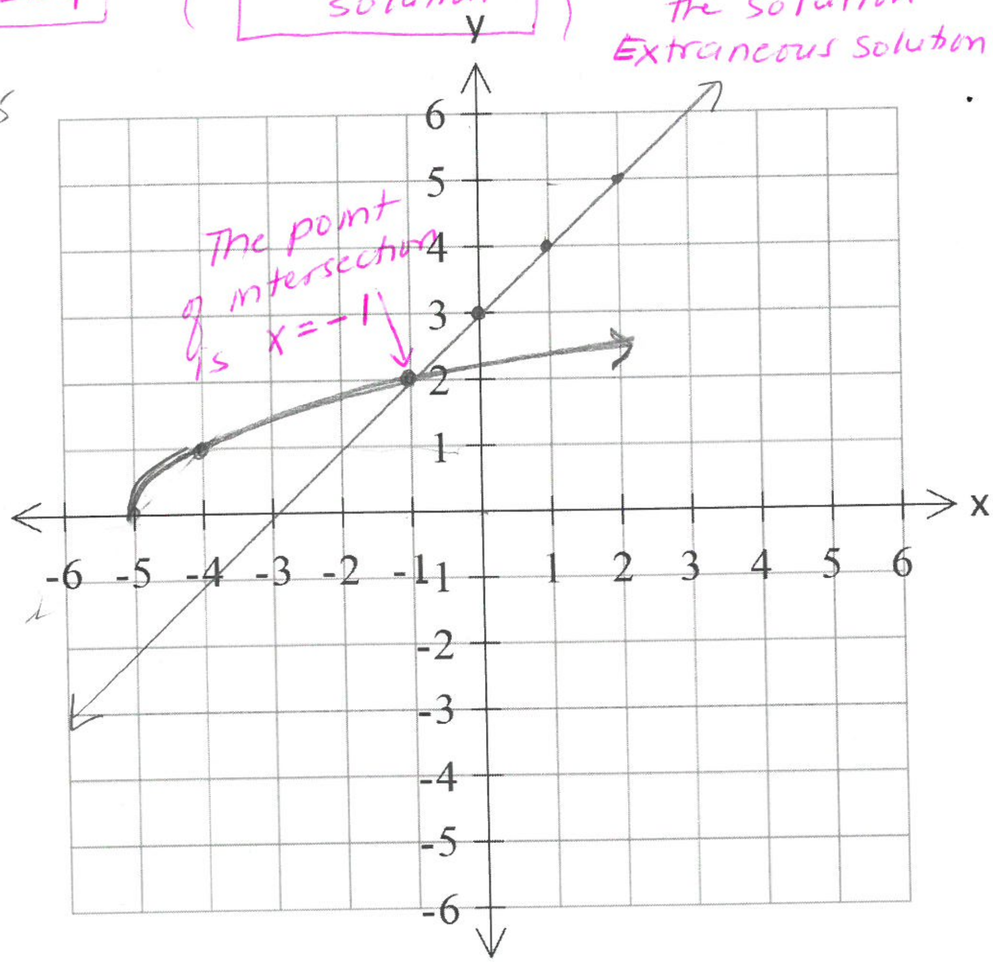
Graphically:

$y = \sqrt{x+5}$

$y = x+5$
y-int $=5$
$m=1$

$y = x+3$

x	$x+5$ $f(x)$	$\sqrt{x+5}$ $\sqrt{f(x)}$
-5	0	0
-4	1	1
-3	2	$\sqrt{2}$
-2	3	$\sqrt{3}$
-1	4	2
0	5	
1	6	



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