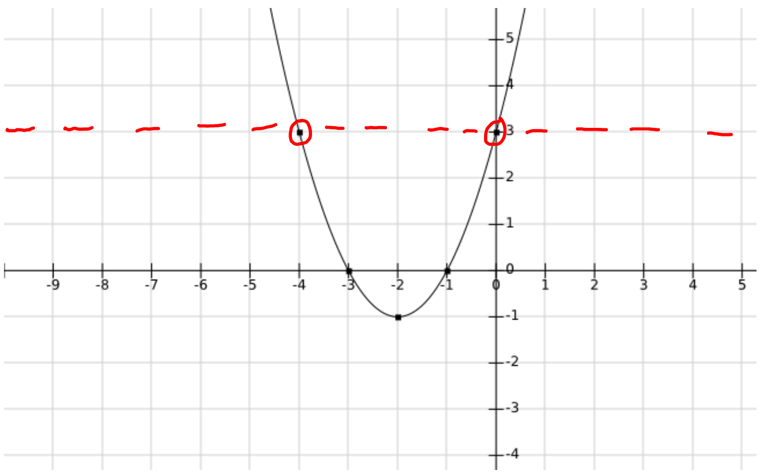
Pre-AP Algebra II
Notes Day #[redacted] 90
Graphing Square Root Functions and Inequalities

Ex. 1:

The below function, $y=(x+2)^2-1$ **does not have an inverse. Why?**



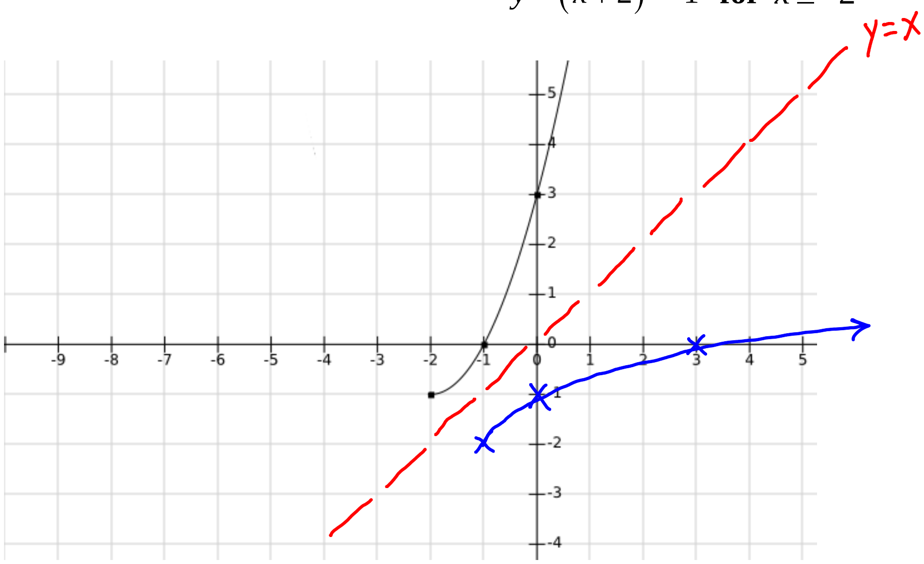
Fails horizontal line test

What are the function transformations?

Left 2, down 1

If we remove a portion of the original graph such that the function can then pass the horizontal line test, then our function's inverse will now be a function. This trick for a parabola is usually done by finding the vertex and then taking only one side of the parabola's points. Conventionally, we keep the right side of the parabola for the domain and toss away the values on the left side of the parabola.

$y=(x+2)^2-1$ **for** $x\ge -2$



Ex. 2: Graph the inverse

This is called placing a <u>restriction</u> on the function. This restriction allows us to take only the values we need to successfully build an inverse function. For $y=x^2$**, the inverse is** $y=\pm\sqrt{x}$**. Since this is not a function however, we limit the inverse function to** $y=\sqrt{x}$**. This is the positive root and corresponds to the right side of the parabola of the original function (** $y=x^2$ **for** $x\ge 0$ **).**

Parent Square Root Function:

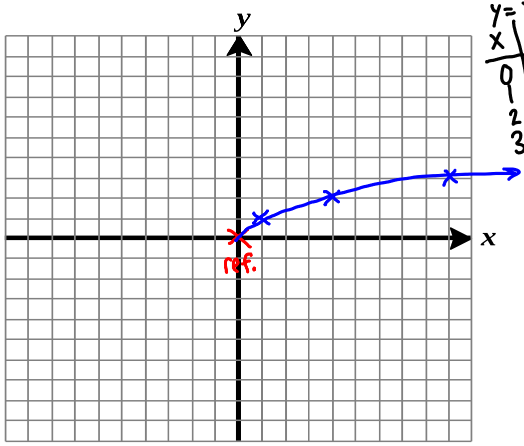
$y=\sqrt{x}$

$y=a\sqrt{b(x-h)}+k$ [Transformation Equation]

$y=x^2 \to y=\sqrt{x}$

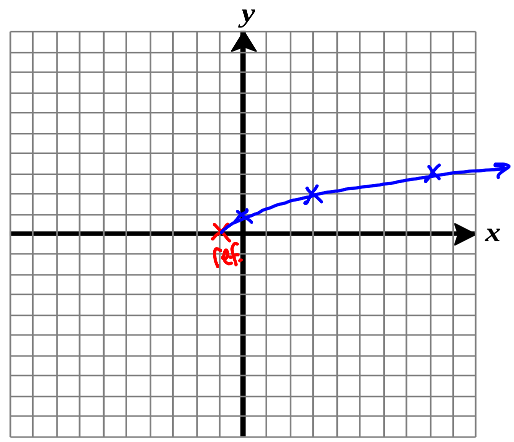
x	y
0	0
1	1
2	4
3	9

x	y
0	0
1	1
4	2
9	3



Ex. 3: $y=\sqrt{x+1}$

Left 1

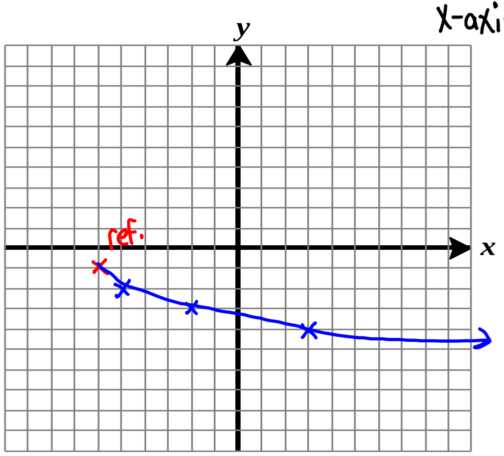


Ex. 4: $y+1=-\sqrt{x+6}$

$-1 \quad -1$

$y=-\sqrt{x+6}-1$

- Left 6
- down 1
- Reflection over x-axis

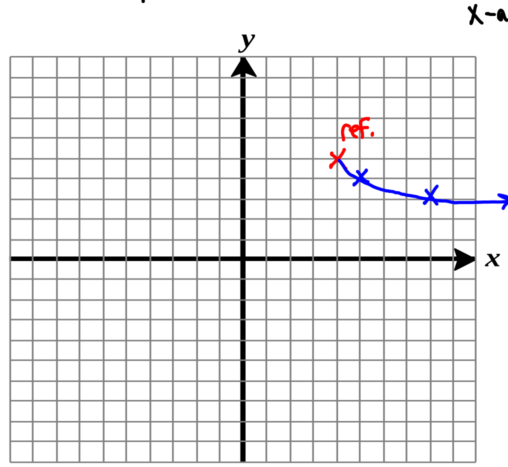


Ex. 5: $y-5=-\sqrt{x-4}$

$+5 \quad +5$

$y=-\sqrt{x-4}+5$

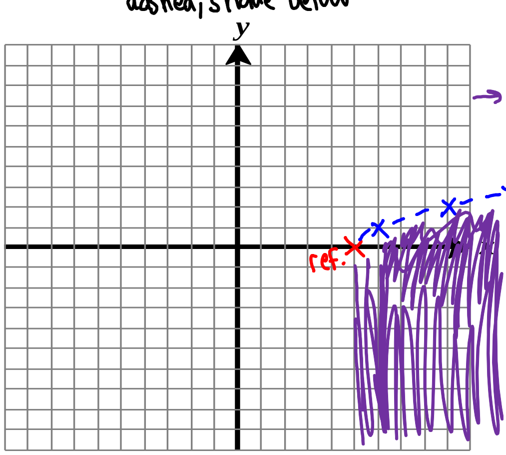
- Right 4
- up 5
- Reflection over x-axis



Ex. 6: $y<\sqrt{x-5}$

dashed, shade below

- Right 5

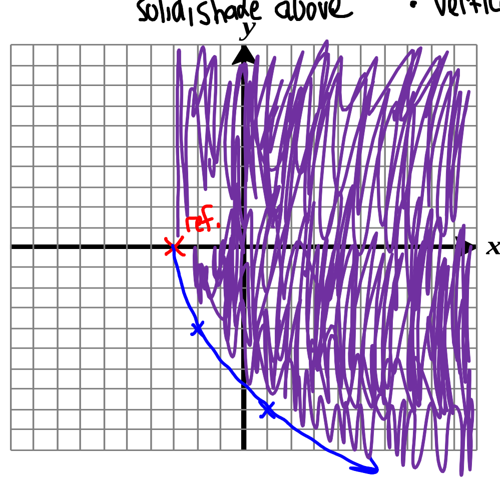


→ only shade on the function's domain

Ex. 7: $y\geq-4\sqrt{x+3}$

solid, shade above

- Left 3
- Vertical Stretch by a factor of 4
- Reflection over the x-axis



x	y
0	0
1	1
4	2
9	3

$\cdot -4$ →

x	y
0	0
1	−4
4	−8
9	−12