

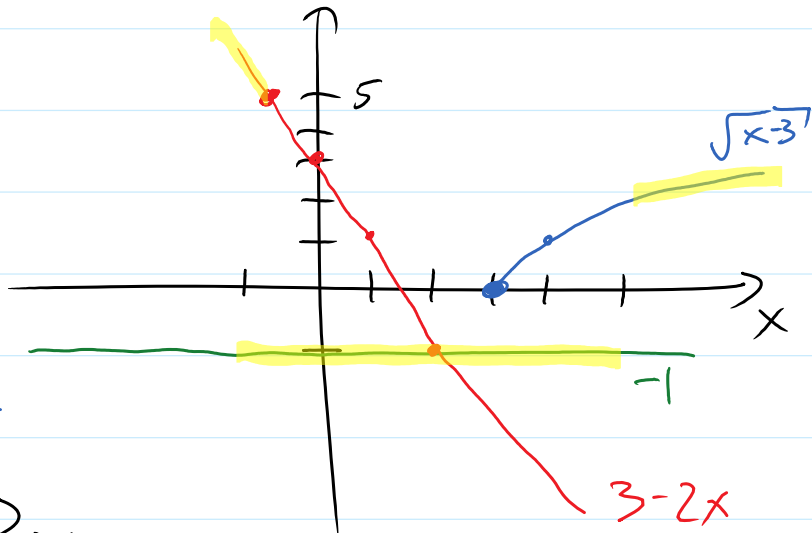
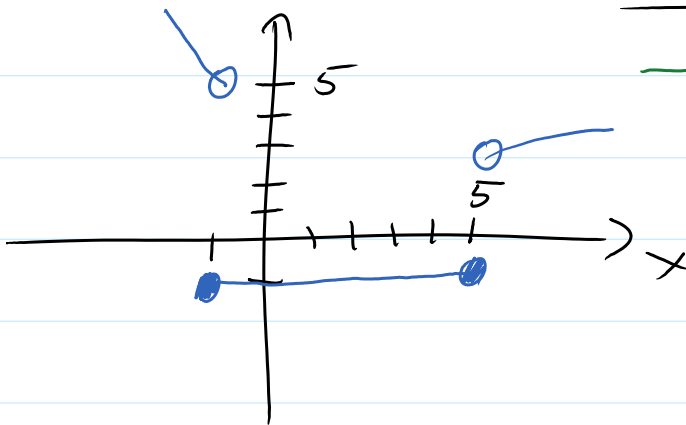
Section 2.5

Ex: Plot $f(x) = \begin{cases} \sqrt{x-3}, & \text{if } x > 5 \\ -1, & \text{if } -1 \leq x \leq 5 \\ 3-2x, & \text{if } x < -1 \end{cases}$

$$f(x) = \sqrt{x}$$

$$f(x-c) = \sqrt{x-c}$$

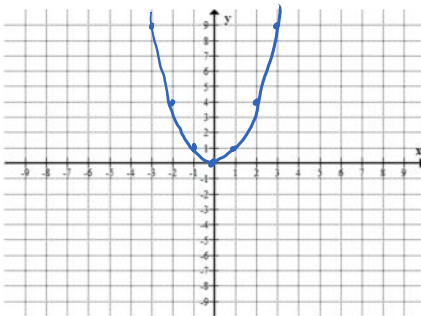
$$\underline{f(x)-c = \sqrt{x}-c}$$



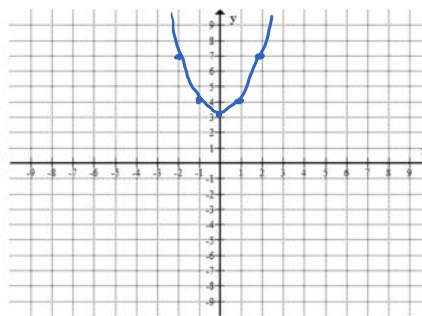
Graphing using transformations. You studied this graphing techniques in College Algebra. Here is the summary of graphing using transformations : <https://www.youtube.com/watch?v=An29CALyJAA>. Please recall by doing the following exercises

1. Graph $y = x^2 + 3$ and $y = x^2 - 4$. Start with the basic function. Plot exactly 4 points when graphing it.

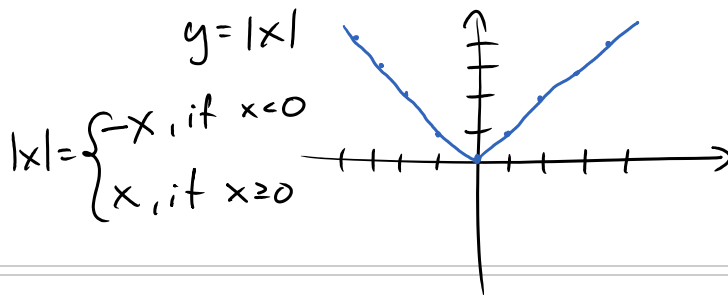
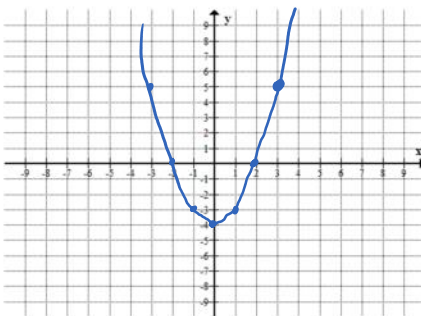
Basic function $y = x^2$



$y = x^2 + 3$

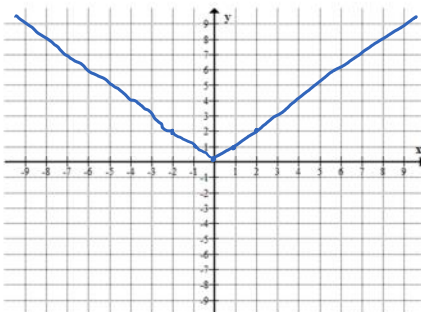


$y = x^2 - 4$

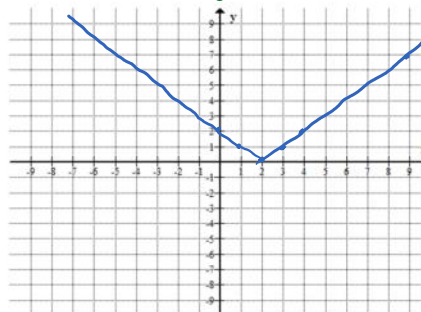


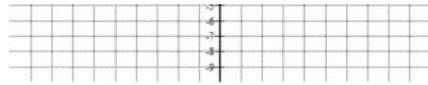
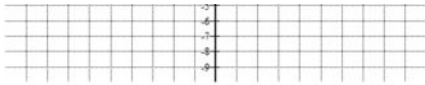
2. Graph $y = |x-2|$ and $y = |x+4|$. Start with the basic function. Plot exactly 4 points when graphing it.

Basic function: $y = |x|$

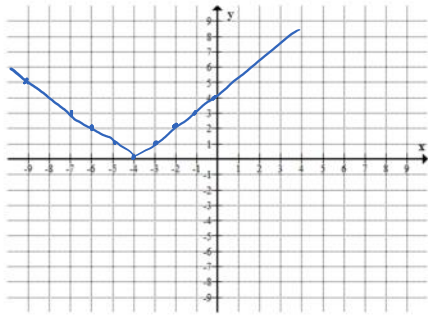


$y = |x-2|$ right by 2





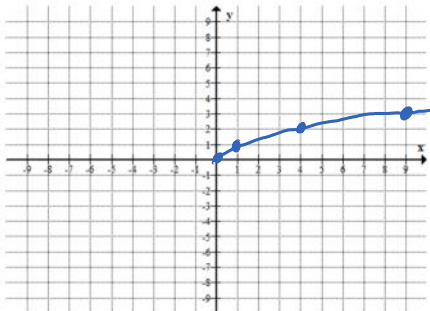
$$y = |x + 4|$$



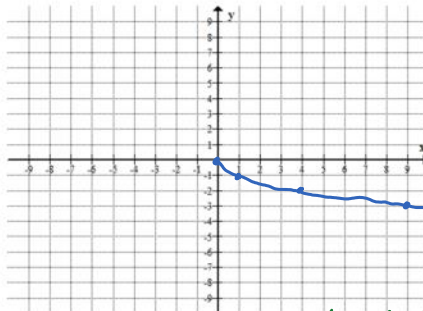
left by 4

3. Graph $y = -\sqrt{x}$, $y = \sqrt{-x}$, $y = 3\sqrt{x}$, $y = \frac{1}{3}\sqrt{x}$, $y = \sqrt{2x}$. Start with the basic function. Plot exactly 4 points when graphing it.

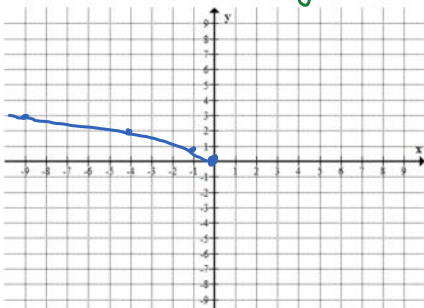
Basic function $y = \sqrt{x}$



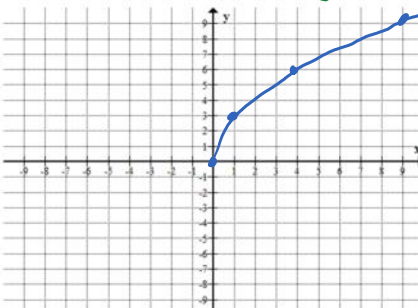
$y = -\sqrt{x}$ *ref. about the x-axis*



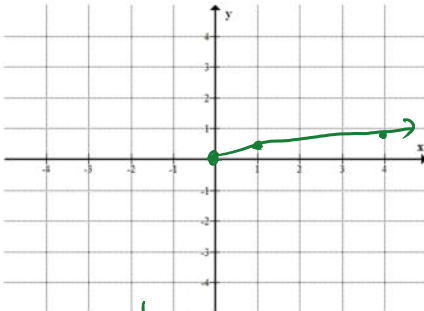
$y = \sqrt{-x}$ *ref. about the y-axis*



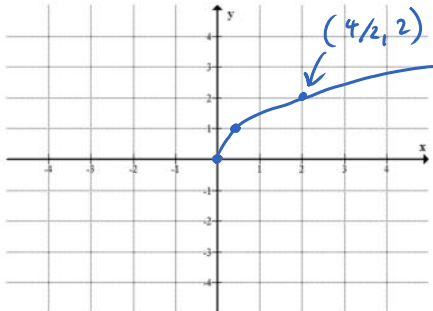
$y = 3\sqrt{x}$ *vert. stretch by 3*



$y = \frac{1}{3}\sqrt{x}$ *ver. shrink by 1/3*



$y = \sqrt{2x}$ *hor. shrink by 2*



hor. shrink by 4 $\sqrt{4x} = 2\sqrt{x}$

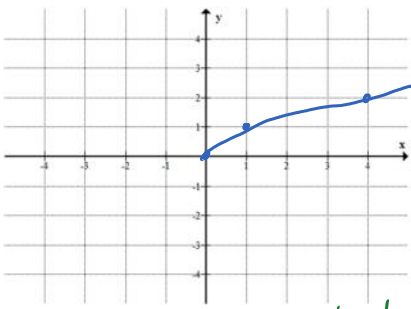
ver. stretch
reflection x-axis \downarrow *left 1*
 \downarrow *up 2*

vertical stretch by 2

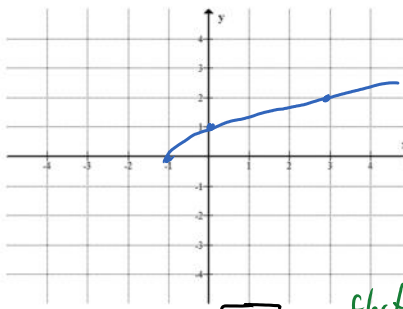
- 1) hor. shift
- 2) stretch shrink
- 3) reflection
- 4) vert. shift

4. Graph $y = -2\sqrt{x+1} + 2$ using transformations. Start with the basic function. Plot accurately at least 3 points and use them to perform transformations. Do not graph by plotting the points! Show one transformation at a time in a correct order (clearly labeled). Write the equation of each graph

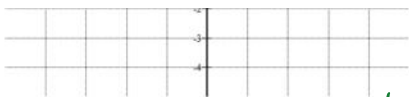
$y = \sqrt{x}$



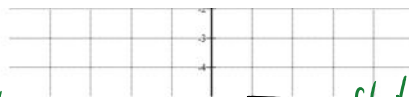
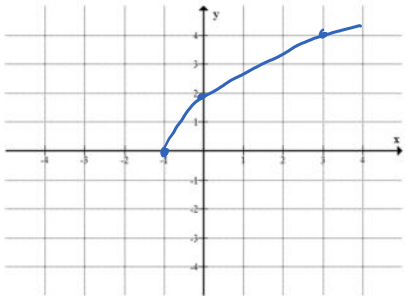
$y = \sqrt{x+1}$ *left 1*



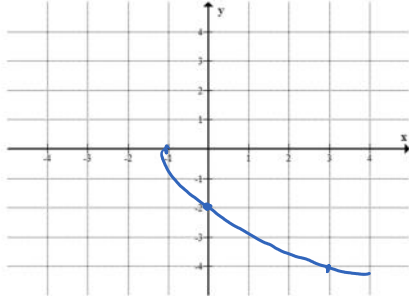
hor. shift



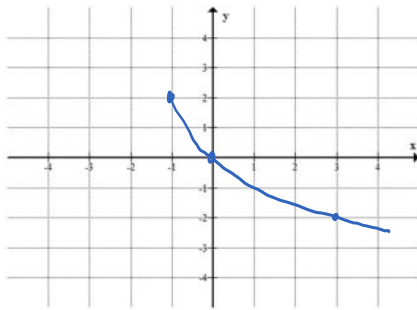
$$y = 2\sqrt{x+1} \quad \text{vert. stretch by 2}$$



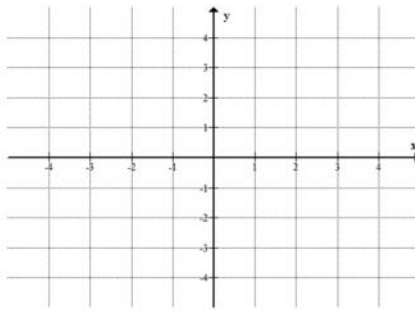
$$y = -2\sqrt{x+1} \quad \text{reflection x-axis}$$



$$y = -2\sqrt{x+1} + 2 \quad \text{up 2}$$



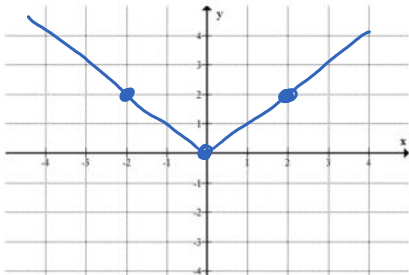
$$y = \underline{\hspace{2cm}}$$



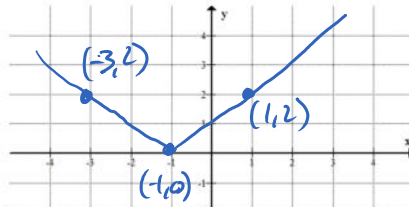
reflection x-axis
hor. shrink by 2
left 1
down 2

5. Graph $y = \frac{1}{2}|2x+1|-2$ using transformations. Start with the basic function. Plot accurately at least 3 points and use them to perform transformations. Do not graph by plotting the points! Show one transformation at a time in a correct order (clearly labeled). Write the equation of each graph

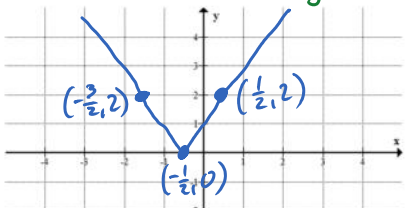
$$y = |x|$$



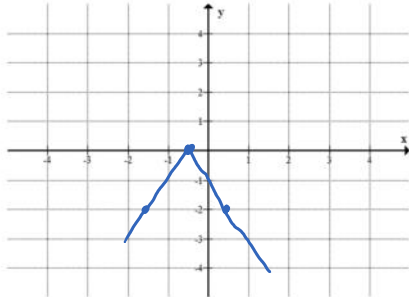
$$y = |x+1| \quad \text{left by 1}$$



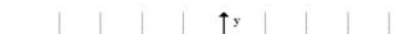
$$y = |2x+1| \quad \text{hor. shrink by 2}$$



$$y = -|2x+1| \quad \text{reflection x-axis}$$

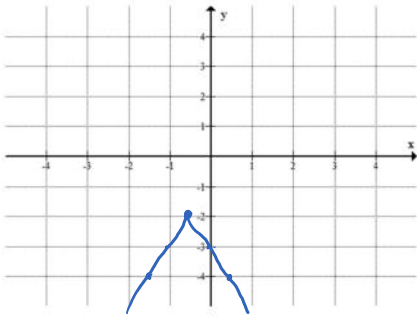


$$y = -|2x+1|-2 \quad \text{down by 2}$$



$$y = \underline{\hspace{2cm}}$$

$$y = -|2x+1| - 2 \quad \text{down by } 2$$



$$y = \underline{\hspace{2cm}}$$

