8/30

Wednesday, August 30, 2017 10:59 AM

$f(x)=\sqrt{2x}$ find diff quotient

$$\frac{f(x+h)-f(x)}{h}=\frac{\sqrt{2(x+h)}-\sqrt{2x}}{h}\cdot\frac{\sqrt{2(x+h)}+\sqrt{2x}}{\sqrt{2(x+h)}+\sqrt{2x}}$$

$$=\frac{2(x+h)-2x}{h\left(\sqrt{2(x+h)}+\sqrt{2x}\right)}=\frac{2\cancel{h}}{\cancel{h}\left(\sqrt{2(x+h)}+\sqrt{2x}\right)}$$

$$=\boxed{\frac{2}{\sqrt{2(h+x)}+\sqrt{2x}}}$$

Section 2.5 cont

Horizontal stretch / shrink

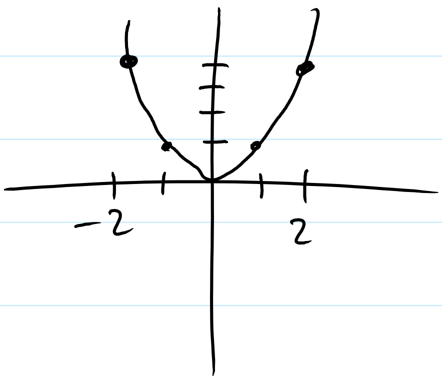
Let f be a function and $c>0$.

- If $c>1$, the graph $y=f(c\cdot x)$ is the graph of $y=f(x)$ horizontally shrunk by dividing each of it's x-coordinates by c.

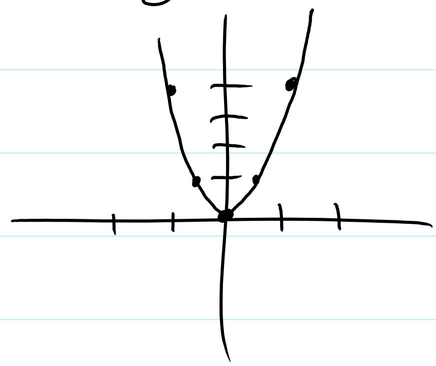
- If $0<c<1$, ... $y=f(c\cdot x)$ is the

- If $0<c<1$, ... $y=f(c\cdot x)$ is the graph of $y=f(x)$ horizontally stretched by ~~multip.~~ divided each x-coor. by c.

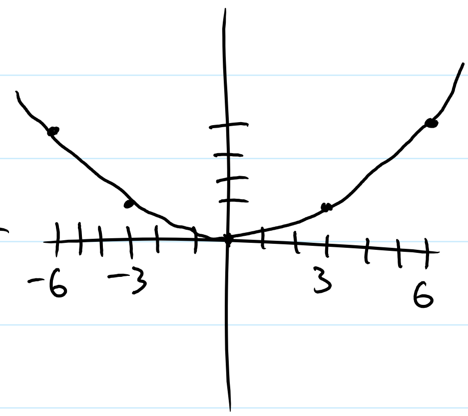
$y=x^2$



$y=(2x)^2$



$y=(\frac{1}{3}x)^2$



Order of Transformations:

1. Horizontal shift
2. Stretch or shrink
3. reflections
4. vertical shift

Plot $\sqrt{2x+4}-3$ using transformations.

$$\sqrt{2x+4}-3 = \sqrt{2(x+2)}-3$$

An example of how not to do it!

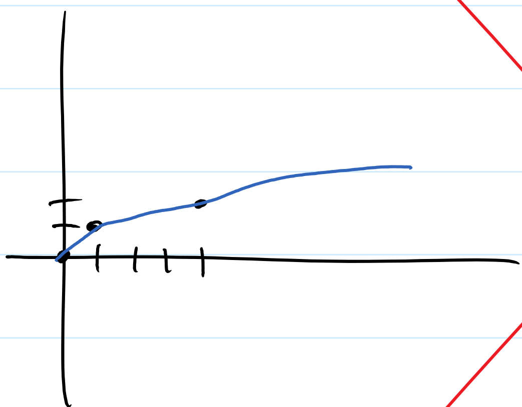
$$\sqrt{x} \xrightarrow{\leftarrow \text{ by } 2} \sqrt{x+2} \xrightarrow{\rightarrow\leftarrow \text{ by factor of } 2} \sqrt{2(x+2)} \longrightarrow \sqrt{\cancel{2}(x+2)}-3$$

$\sqrt{x} \longrightarrow \sqrt{x+2} \longrightarrow \sqrt{2(x+2)} \longrightarrow \sqrt{2(x+2)} - 3$

$\downarrow$ by 3

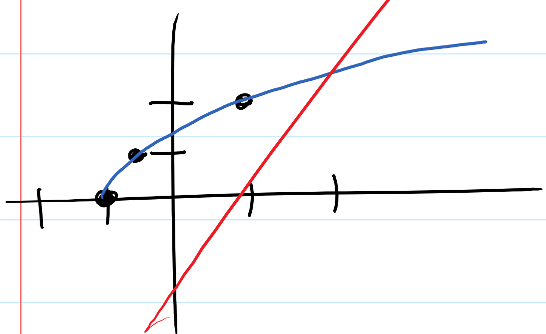
$\sqrt{x}$

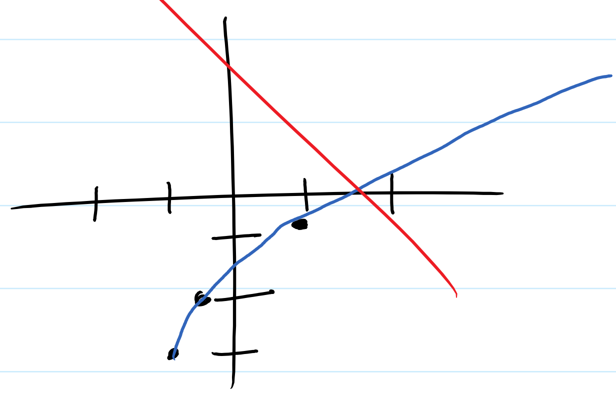
$\sqrt{x+2}$



$\sqrt{2(x+2)}$

$\sqrt{2(x+2)} - 3$



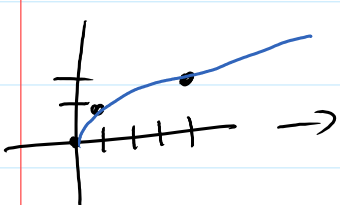


$\leftarrow$ by 2

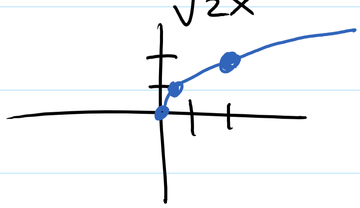
$\sqrt{x} \to \sqrt{2x} \longrightarrow \sqrt{2(x+2)} \to \sqrt{2(x+2)} - 3$

$\to\leftarrow$ by 2

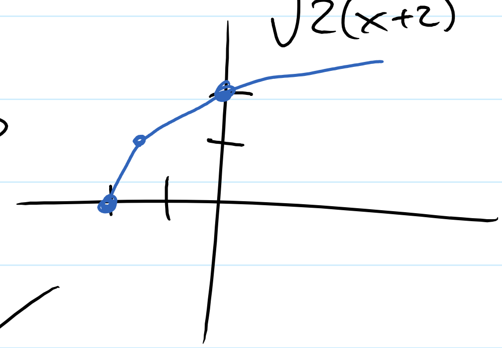
$\downarrow$ by 3



$\sqrt{2x}$



$\sqrt{2(x+2)}$



$\sqrt{2(x+2)} - 3$