Homework Questions

47&48 moved to Friday,
38 moved to tonight

40 d $f(g(-4))$

$f(x)=\sqrt{x}$ $g(x)=x^2-1$

$g(-4)=16-1=15$

$f(15)=\sqrt{15}$

7. $f(x)=x^3$

$$\frac{f(x+\Delta x)-f(x)}{\Delta x}$$

$$\frac{(x+\Delta x)^3-x^3}{\Delta x}$$

$$\frac{(x+\Delta x)^2(x+\Delta x)-x^3}{\Delta x}$$

$$\frac{(x^2+2x\Delta x+\Delta x^2)(x+\Delta x)-x^3}{\Delta x}$$

$$\frac{x^3+2x^2\Delta x+x\Delta x^2+x^2\Delta x+2x\Delta x^2+\Delta x^3-x^3}{\Delta x}$$

$$\frac{3x^2\Delta x+3x\Delta x^2+\Delta x^3}{\Delta x}$$

$$3x^2+3x\Delta x+\Delta x^2$$

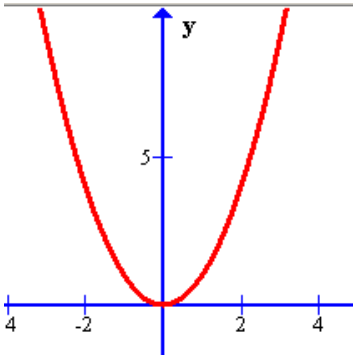
3. $f(x)=\begin{cases}2x+1 & x<0\\ 2x+2 & x\geq 0\end{cases}$

a) $f(-2)=-4+1=-3$

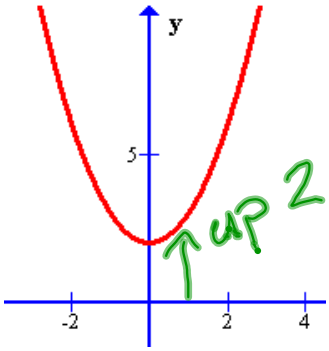
d) $f(s^2+2)=2s^2+4+2=2s^2+6$

Transformations

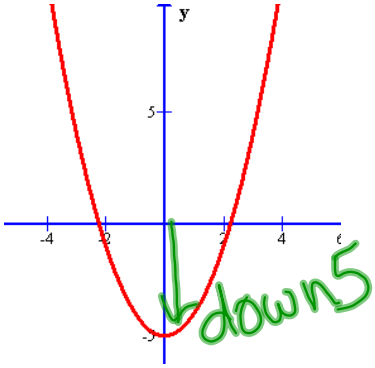
$f(x)=x^2$



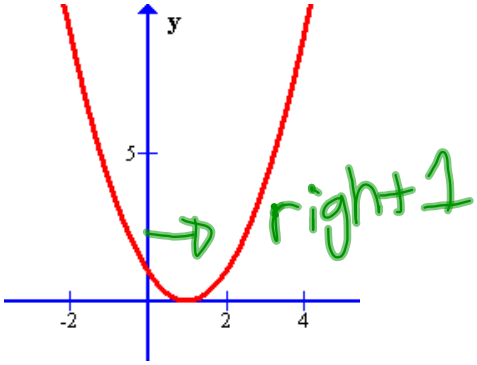
$f(x)=x^2+2$



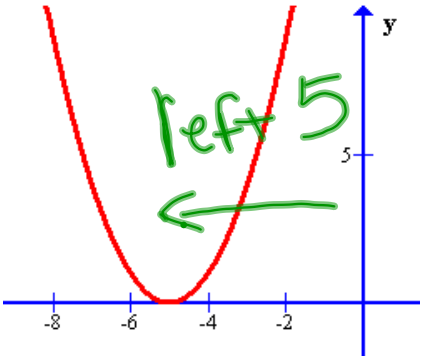
$f(x)=x^2-5$



$f(x)=(x-1)^2$



$f(x)=(x+5)^2$



General Rules for Transformations

$f(x+a)$ $f(x-a)$

$f(x)+b$ $f(x)-b$

Domain and Range

Domain: All x-values

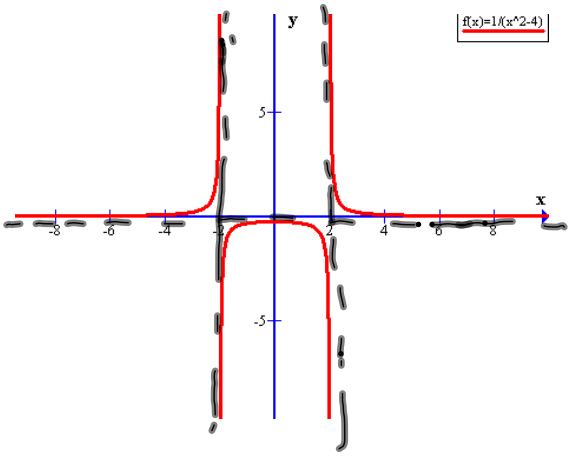
Range: All y-values

What makes a function undefined?

- dividing by zero
- $\sqrt{\text{neg}}$

Good way to find domain and range is to graph the function, but be careful about holes!

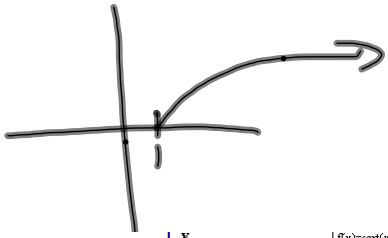
E1) find the domain and range of $y = \frac{1}{x^2 - 4}$



D: $x \neq -2, 2$

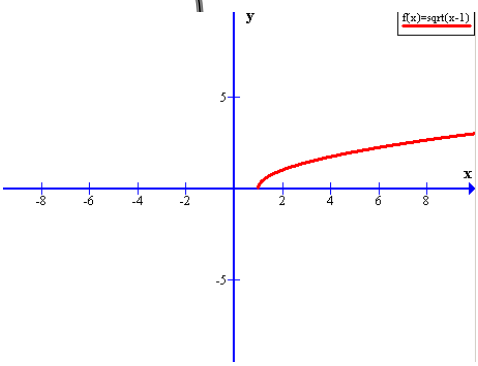
R: $y \neq 0$

E2) Find domain and range of $f(x) = \sqrt{x - 1}$



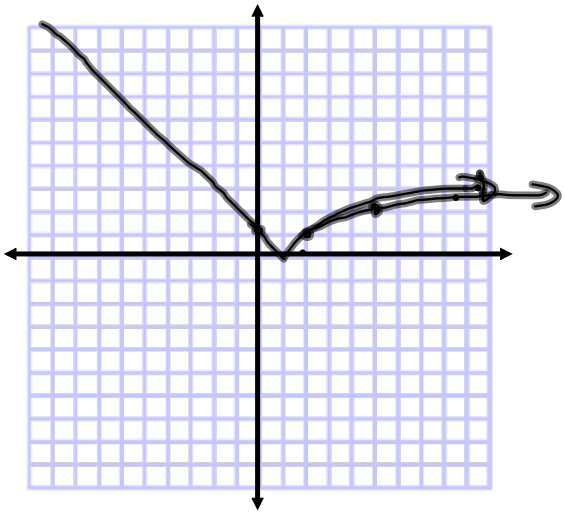
D: $x \geq 1$

R: $y \geq 0$



E3) find the domain and range of

$$f(x) = \begin{cases} 1 - x, x < 1 \\ \sqrt{x - 1}, x \geq 1 \end{cases}$$



D: $\mathbb{R}$

R: $y \geq 0$

$$f(x) = \frac{x-5}{x^2-25}$$