Today's Plan:

Learning Target (standard): I will evaluate and graph piecewise functions. I will determine their domain and range. I will calculate the average rate of change for functions. I will describe properties of functions.

Students will: Complete practice problems over previous concepts at the boards, put up homework problems on the board and make necessary corrections to their own work, and solve practice quiz problems.

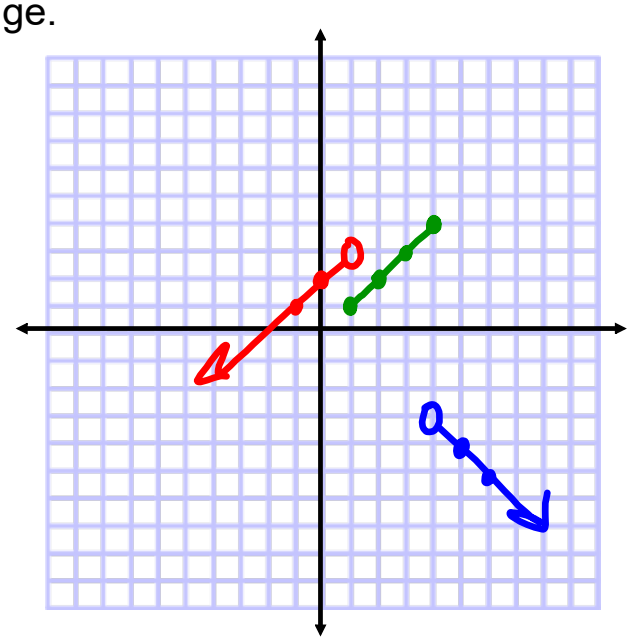
Teacher will: Provide practice problems over previous concepts, check homework problems for accuracy and provide students feedback, describe and provide practice quiz problems.

Assessment: Board work, homework check and practice quiz

Differentiation: Students will work at the board, go over and correct homework at their seats, actively engage in practice quiz problems.

Graph and find the domain and range.

$$f(x)=\begin{cases} x+2, & x<1 \\ |x|, & 1\le x\le 4 \\ 1-x, & x>4 \end{cases}$$



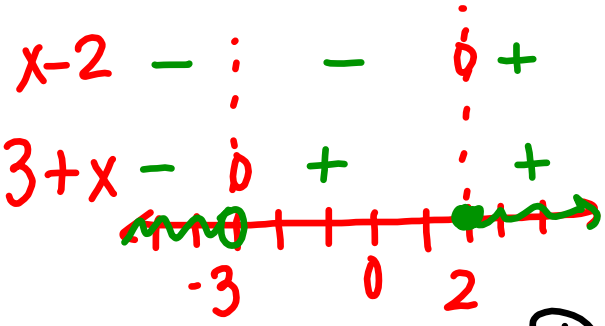
D: $\mathbb{R}$

R: $\{y \mid y \le 4\}$

Find the domain.

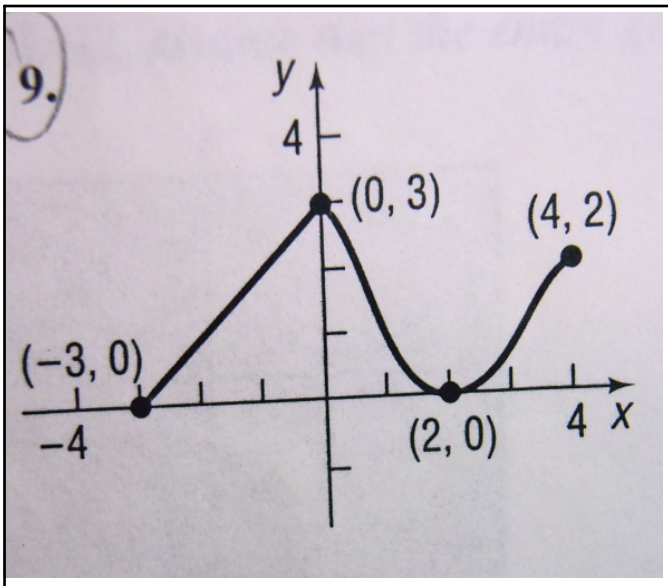
$$f(x)=\sqrt{\frac{x-2}{3+x}}$$

$\frac{x-2}{3+x} \geq 0$



D: $\{x \mid x<-3, x \geq 2\}$

$(-\infty,-3) \cup [2,\infty)$



D: $\{x \mid -3 \leq x \leq 4\}$

R: $\{y \mid 0 \leq y \leq 3\}$

Increasing: $(-3,0), (2,4)$

Decreasing: $(0,2)$

Constant: —

I_x: $(-3,0), (2,0)$

I_y: $(0,3)$

Even/Odd/Neither? Why?

$$f(x)=\frac{x^3-x}{2x^5-x^3+x}$$

$f(x)=\frac{x(x^2-1)}{x(2x^4-x^2+1)}$

$f(x)=\frac{x^2-1}{2x^4-x^2+1}$

$f(-x)=\frac{(-x)^2-1}{2(-x)^4-(-x)^2+1}$

$f(-x)=\frac{x^2-1}{2x^4-x^2+1}$

∴ even

$f(-x)=f(x)$

Find the AROC between 2 and x when:

$$f(x)=\frac{2-3x}{x+1}$$

$f(2)=\frac{2-3(2)}{2+1}=\frac{2-6}{3}$

$f(2)=-\frac{4}{3}$

$AROC=\frac{f(x)-f(2)}{x-2}$

$=\frac{\frac{2-3x}{x+1}+\frac{4}{3}}{x-2}$

$=\frac{\frac{6-9x}{3(x+1)}+\frac{4x+4}{3(x+1)}}{x-2}$

$=\frac{\frac{-5x+10}{3(x+1)}}{\frac{x-2}{1}}$

$=-\frac{5(x-2)}{3(x+1)}\cdot\frac{1}{x-2}$

$AROC=\frac{-5}{3(x+1)}$

$f(x) = 2x^2 - 4$

$a) f(-x) =$ $2(-x)^2-4$

$f(-x)=2x^2-4$

$b) -f(x) =$ $-(2x^2-4)$

$-f(x)=-2x^2+4$

$f(x) = 2x^2 - 4$

$c) f(2x) =$ $2(2x)^2-4$

$=2(4x^2)-4$

$f(2x)=8x^2-4$

$d) f(x-3) =$ $2(x-3)^2-4$

$=2(x^2-6x+9)-4$

$=2x^2-12x+18-4$

$f(x-3)=2x^2-12x+14$

$f(x) = 2x^2 - 4$

e) $f\left(\frac{1}{x}\right) = 2\left(\frac{1}{x}\right)^2 - 4$

$= 2\left(\frac{1}{x^2}\right) - 4$

$f\left(\frac{1}{x}\right) = \frac{2}{x^2} - 4$

f) $\frac{1}{f(x)} = \frac{1}{2x^2 - 4}$

Find the domain.

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

$3 - 4x \geq 0$

$-4x \geq -3$

$x \leq \frac{3}{4}$

D: $\left\{x \mid x \leq \frac{3}{4}\right\}$

Find the domain.

$$f(x)=\frac{\sqrt{x-1}}{x^2-5x+6}$$

$x-1\geq 0$

$x\geq 1$

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

$(x-3)(x-2)=0$

$x=2,3$

D: $\{x \mid x\geq 1, x\neq 2,3\}$

Even/Odd/Neither? Why?

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

$f(x)=\frac{x(x^4-1)}{2x}$

$f(x)=\frac{x^4-1}{2}$

$f(-x)=\frac{(-x)^4-1}{2}$

$f(-x)=\frac{x^4-1}{2}$

$\therefore$ even

$f(-x)=f(x)$