Today's Plan:

Learning Target (standard): I will perform operations on functions and determine the domain and range of the resulting function.

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, take notes over new material and complete practice problems over new concepts.

Teacher will: Provide practice problems over previous concepts, check homework problems for accuracy and provide students feedback, describe and provide examples of new concepts and assign students assessment problems over new concepts.

Assessment: Board work, homework check and homework assignment

Differentiation: Students will work at the board, go over and correct homework at their seats, actively engage in lecture over new concepts, practice new concepts with the aid of other students and the teacher and complete homework assignment.

p.158 #4,14,22,24,28,36,40 * Unit TEST on Friday! *

$4a)\ (f+g)(x)=4x^3+2x^2+4-D:\mathbb{R}$

$b)\ (f-g)(x)=-4x^3+2x^2+2-D:\mathbb{R}$

$c)\ (f\cdot g)(x)=8x^5+12x^3+2x^2+3-D:\mathbb{R}$

$d)\ \left(\dfrac{f}{g}\right)(x)=\dfrac{2x^2+3}{4x^3+1}-D:\left\{x\,|\,x\neq-\dfrac{\sqrt[3]{2}}{2}\right\}$

$4x^3+1=0$

$4x^3=-1$

$\sqrt[3]{x^3}=\sqrt[3]{-\frac{1}{4}}$

$x=\dfrac{-1}{\sqrt[3]{4}}\cdot\dfrac{\sqrt[3]{2}}{\sqrt[3]{2}}$

$x=-\dfrac{\sqrt[3]{2}}{2}$

$14a)\ g(4)=31\rightarrow(f\circ g)(4)=95$

$b)\ f(2)=8\rightarrow(g\circ f)(2)=127$

$c)\ f(1)=5\rightarrow(f\circ f)(1)=17$

$d)\ g(0)=-1\rightarrow(g\circ g)(0)=1$

p.158 #4,14,22,24,28,36,40

$$22a)\, g(4)=\frac{2}{17}\rightarrow (f\circ g)(4)=\frac{8}{4913}$$

$$b)\, f(2)=8\rightarrow (g\circ f)(2)=\frac{2}{65}$$

$$c)\, f(1)=1\rightarrow (f\circ f)(1)=1$$

$$d)\, g(0)=2\rightarrow (g\circ g)(0)=\frac{2}{5}$$

$$24)\, (f\circ g)(x)=\frac{x}{3x-2}$$

$$D:\left\{x\,|\,x\neq 0,\frac{2}{3}\right\}$$

$$28)\, (f\circ g)(x)=\sqrt{-2x-1}$$

$$D:\left\{x\,|\,x\leq -\frac{1}{2}\right\}$$

p.158 #4,14,22,24,28,36,40

$$36a)\, (f\circ g)(x)=4x^4+12x^2+10-D:\mathbb{R}$$

$$b)\, (g\circ f)(x)=2x^4+4x^2+5-D:\mathbb{R}$$

$$c)\, (f\circ f)(x)=x^4+2x^2+2-D:\mathbb{R}$$

$$d)\, (g\circ g)(x)=8x^4+24x^2+21-D:\mathbb{R}$$

p.158 #4,14,22,24,28,36,40

$D_f: \{x \mid x \neq -3\}$

$D_g: \{x \mid x \neq 0\}$

$$40a)\ (f \circ g)(x) = \frac{2}{3x+2} \quad D: \left\{x \mid x \neq -\frac{2}{3}, 0\right\}$$

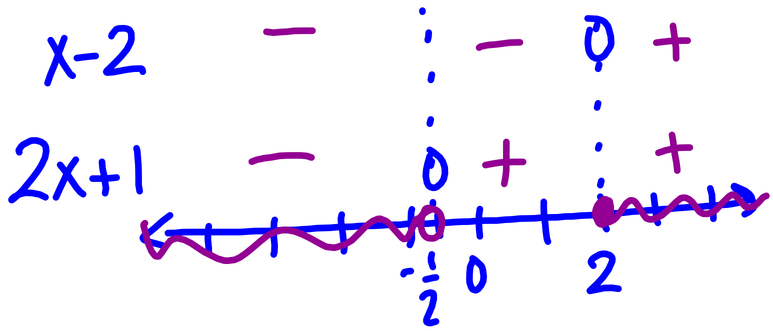
$$b)\ (g \circ f)(x) = \frac{2x+6}{x} \quad D: \{x \mid x \neq -3, 0\}$$

$$c)\ (f \circ f)(x) = \frac{x}{4x+9} \quad D: \left\{x \mid x \neq -3, -\frac{9}{4}\right\}$$

$$d)\ (g \circ g)(x) = x \quad D: \{x \mid x \neq 0\}$$

Find the domain:

$$f(x) = \frac{\sqrt{x-2}}{\sqrt{2x+1}} = \sqrt{\frac{x-2}{2x+1}} \qquad \frac{x-2}{2x+1} \geq 0$$



$$D: \left\{x \mid x < -\frac{1}{2},\ x \geq 2\right\}$$

Even/Odd/Neither? Why?

$$f(x)=\frac{-5x^2-3}{2x^4-5x^2}$$

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

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

$$f(-x)=\frac{-5(-x)^2-3}{2(-x)^4-5(-x)^2}$$

$$f(-x)=\frac{-5x^2-3}{2x^4-5x^2}$$

$\therefore$ even $f(-x)=f(x)$

Find each of the following and the domain:

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

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

$D_f: \{x \mid x\neq 1\}$

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

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

$$=\frac{x}{\cancel{x-1}}\cdot\frac{\cancel{x-1}}{3x-2}$$

$(g\circ f)(x)=\frac{x}{3x-2}$ $D: \{x \mid x\neq \frac{2}{3}, 1\}$

Find the AROC between 1 and 5 when:

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

$$\text{AROC}=\frac{f(5)-f(1)}{5-1}$$

$$=\frac{\frac{6}{23}+2}{4}$$

$$=\frac{\frac{6}{23}+\frac{46}{23}}{4}$$

$$=\frac{\frac{52}{23}}{4}$$

$$=\frac{\cancel{52}^{13}}{23}\cdot\frac{1}{\cancel{4}_1}$$

$$\boxed{\text{AROC}=\frac{13}{23}}$$

$$f(5)=\frac{5+1}{25-2}$$

$$f(5)=\frac{6}{23}$$

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

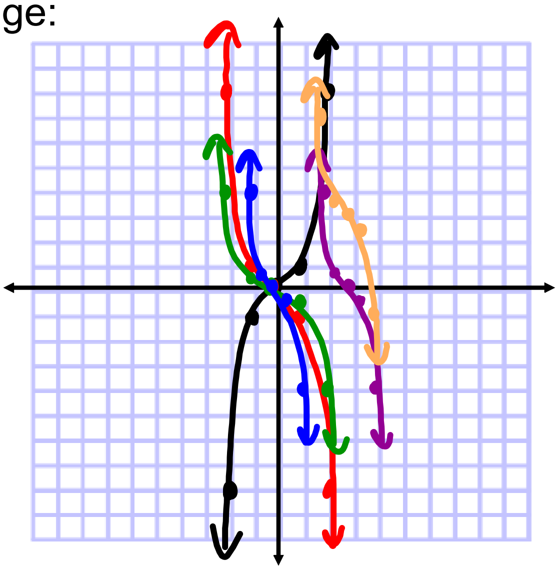
$$=\frac{2}{-1}$$

$$f(1)=-2$$

Graph and find domain and range:

$$y=-\frac{1}{2}(2x-6)^3+3$$

x	y
-2	-8
-1	-1
0	0
1	1
2	8



Parent: $y=x^3$

1) $y=-x^3$ r_x

2) $y=-\frac{1}{2}x^3$ v.c. by $\frac{1}{2}$

3) $y=-\frac{1}{2}(2x)^3$ h.c. by $\frac{1}{2}$

4) $y=-\frac{1}{2}(2(x-3))^3$ shift right 3

5) $y=-\frac{1}{2}(2x-6)^3+3$ shift up 3

D: $\mathbb{R}$

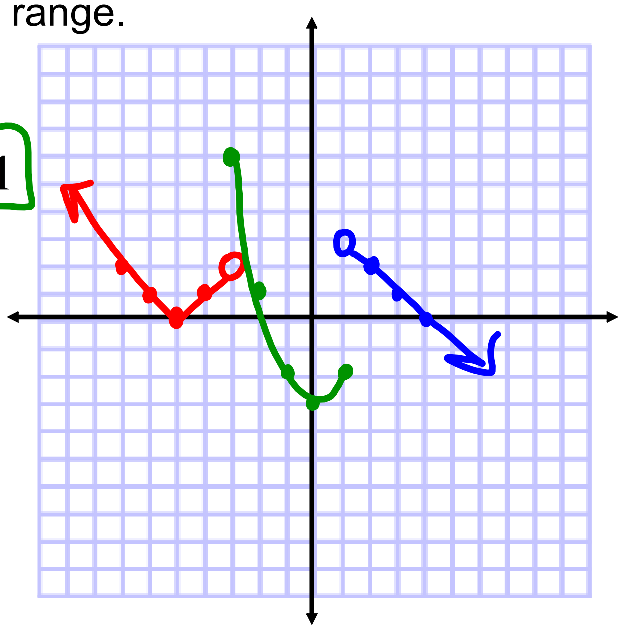
R: $\mathbb{R}$

Graph and find the domain and range.

$x+5=0$

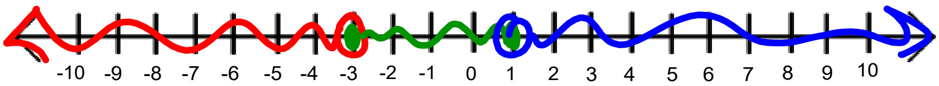
$x=-5$

$$f(x)=\begin{cases} |x+5|, & \boxed{x<-3} \\ x^2-3, & \boxed{-3\le x\le 1} \\ 4-x, & \boxed{x>1} \end{cases}$$



D: $\mathbb{R}$

R: $\mathbb{R}$



Find the AROC between 1 and x when:

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

$f(1)=\frac{1-3}{2-5}$

$=\frac{-2}{-3}$

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

$$AROC=\frac{f(x)-f(1)}{x-1}$$

$$=\frac{\frac{x-3}{2x-5}-\frac{2}{3}}{x-1}$$

$$=\frac{\frac{3x-9}{3(2x-5)}+\frac{-4x+10}{3(2x-5)}}{x-1}$$

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

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

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

$$f(x) = |x|$$

- reflected over the y-axis $f(x) = |-x|$
- vertically stretched by 3 $f(x) = 3|-x|$
- horizontally compressed by 3/4

$$f(x) = 3\left|-\frac{4}{3}x\right|$$

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

- reflected over the x-axis $f(x) = -\sqrt{x}$
- horizontally stretched by 3 $f(x) = -\sqrt{\frac{1}{3}x}$
- shifted left 2

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

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

Review Assignment:

p.174 #9,13,15,19,21,25,27,
31,33,41,43,47,57,65,67

* check answers in the back *

* TEST Friday *