Precalc Study Guide Unit One

Be able to apply the difference quotient to various functions. the difference quotient is $\frac{f(x+h)-f(x)}{h};\ h\neq 0$

$f(x)=3x-10$

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

$f(x)=6x^2-x+3$

Determine of domain from a function/graph and state in interval notation.

$f(x)=\frac{-4}{2x^2+7x-4}$

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

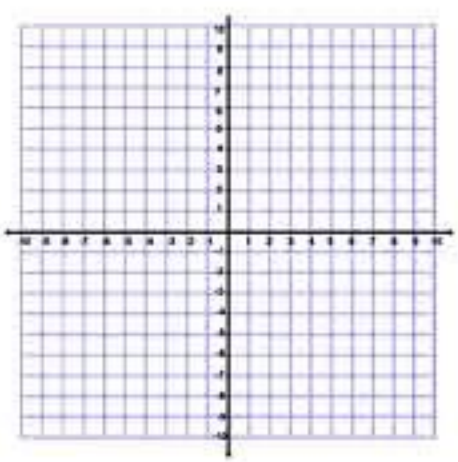
$f(x)=\sqrt{x^2-25}$

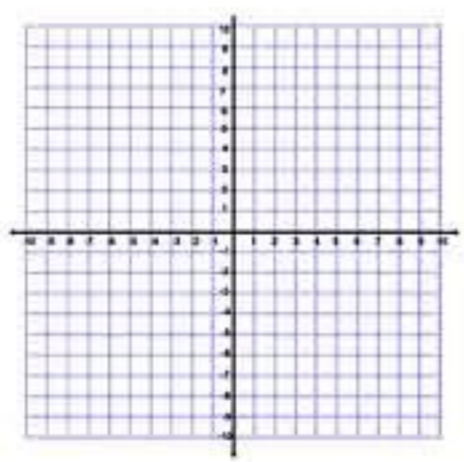
$f(x)=\frac{1}{x^2+8}$

Be able to graph a piece-wise function (linear) by hand

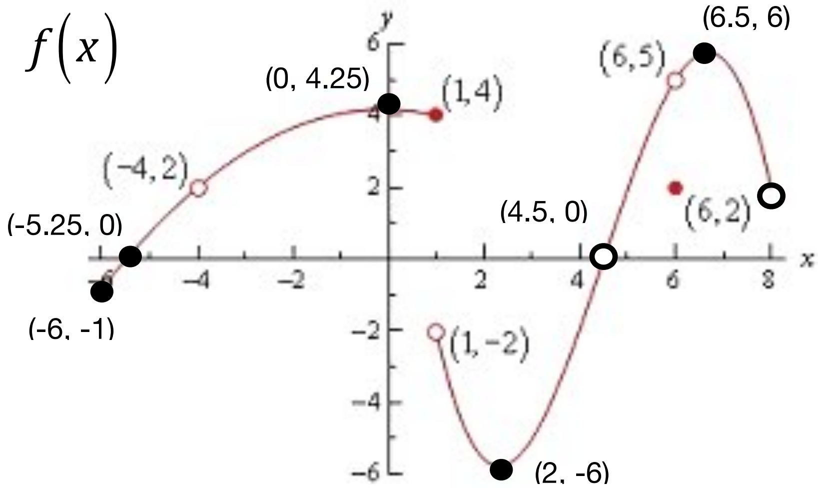
$$f(x)=\begin{cases} 5; & x\leq 0 \\ -x+4; & 0<x<4 \\ x; & x\geq 4 \end{cases}$$

$$f(x)=\begin{cases} \frac{1}{2}x; & x\leq -1 \\ -3x+7; & -1<x<4 \\ -5; & x\geq 4 \end{cases}$$





$f(x)$



Given the graph above, answer the following questions

a) Domain: ____________________

b) Range: ____________________

c) X-intercept(s): ______________________

d) Y - intercept: ____________________

e) f(1) = ________

f) f(6) = ________

g) f(4.5) = _______

h) f(?) = -6 therefore x is ________

i) Find the Average Rate of Change over [-6, -5.25] _____________

Given the function $f(x)=-2x^3-5x^2+4x$ be able to find the information below using a graphing calculator. Make a sketch of the graph with all the information to right.

a) Domain: ____________________

b) Range: ____________________

c) X-intercept(s): ________________

d) Y - intercept: ____________________

e) Relative Min(s): ___________________

f) Relative Max(es): ___________________

g) Increasing Interval(s): ________________

h) Decreasing Interval(s): ______________

Hamster race! Two hamsters challenge each other to a race. Each hamster has a different position function to model their progress as the race unfolds.

Hamster One: $s(t)=\frac{t^3}{9}$

Both where s(t) is feet and "t" is time in seconds.

Hamster Two: $s(t)=\frac{t^2}{3}$

That said, what hamster has the greater Average Velocity in the first three minutes of the race? Show all calculations to support your answer.

If the race lasted four minutes, which hamster won the race? How do you know. Must be mathematically supported for credit.