Precalculus Honors Name_____
Recap on 1.1-1.3

#1-11 cover 1.1 and 1.2 #12-16 cover 1.3

1) Be able to use your calculator to create scatterplots, lists and recognize grapher failure.
2) Be able to solve application problems with volume, distance and free fall.
3) Be able to solve radical equations.
4) Be able to determine if a relation is a function from the equation.
5) Be able to find the domain of a function from the equation.
6) Be able to determine the range of a function from a graph.
7) Be able to determine
8) Be able to find max/min and increasing and decreasing intervals.
9) Be able to determine if a function is even or odd.
10) Be able to find the horizontal, vertical and end behavior asymptotes.
11) Be able to evaluate limits.
12) Be able to graph the 12 basic functions.
13) Be able to graph with transformations.
14) Be able to graph real world situations.
15) Be able to graph functions with more than one horizontal asymptote.
16) Be able to graph a piecewise determined function.

1. **U.S. Petroleum Exports** The average U.S. exports of petroleum for the years 2001–2011, in thousands of barrels per day, are shown in Table 1.15.

Table 1.15 Daily U.S. Oil Exports

Year	Exports (1000 bls./day)
2001	971
2002	984
2003	1027
2004	1048
2005	1165
2006	1317
2007	1433
2008	1802
2009	2024
2010	2353
2011	2924

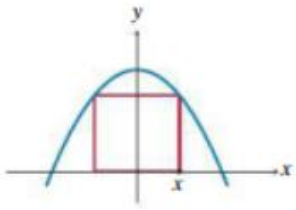
Source: Monthly Energy Review, Aug. 2012, as reported in The World Almanac and Book of Facts 2013.

(a) Sketch a scatter plot of export numbers (y) as a function of years since 2000 (x).

(b) Use quadratic regression to model the data with a quadratic function and superimpose the parabolic curve on the scatter plot. Is it a good fit?

(c) Based on the quadratic model, approximately how many thousands of barrels of oil would the United States export per day in 2016?

2. **Inscribing a Rectangle Under a Parabola**
A rectangle is inscribed between the x-axis and the parabola $y = 36 - x^2$ with one side along the x-axis, as shown in the figure below.



(a) Let x denote the x-coordinate of the point denoted in the figure. Write the area A of the rectangle as a function of x.

(b) What values of x are in the domain of A?

(c) Sketch a graph of $A(x)$ over the domain.

(d) Use your grapher to find the maximum area that such a rectangle can have.

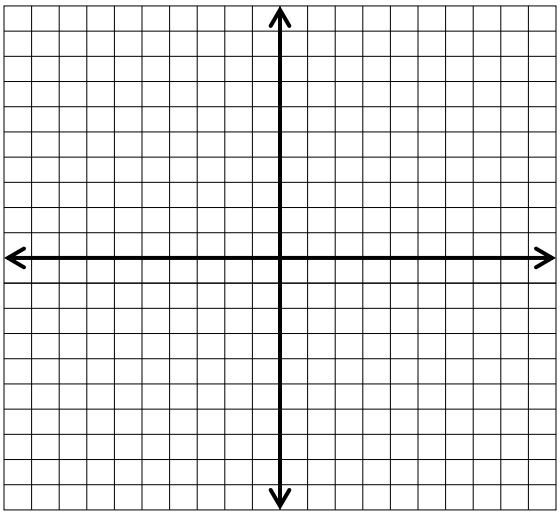
3. Solve algebraically $x = -1 + 2\sqrt{x+4}$

4. Function? $y - x = x^2 - |y|$

.

5. Sketch a complete graph of the function and then determine whether the function is continuous or discontinuous

a. $f(x) = \begin{cases} x^2 + 5 & x \geq 0 \\ -|x+3| & x < 0 \end{cases}$



b. Continuous or discontinuous?

c. $\lim_{x \to 0^-} f(x) =$_____ $\lim_{x \to 0^+} f(x) =$_____

d. $f(0) =$_____

6. Given $f(x) = \dfrac{6x^2 - x - 1}{2x^2 + 9x - 5}$ State:

Domain (without a calculator):

Range (using a calculator):

State all types of discontinuities:

Is there a Horizontal Asymptote?

End behavior: $\lim_{x \to \infty} g(x) =$_____ $\lim_{x \to -\infty} g(x) =$_____

Other limits: $\lim_{x \to -5^-} g(x) =$_____ $\lim_{x \to -5^+} g(x) =$_____

$\lim_{x \to \frac{1}{2}^-} g(x) =$_____ $\lim_{x \to \frac{1}{2}^+} g(x) =$_____

7. Look at the graph from #6 on your graphing calculator and determine the following:

Increasing intervals_____ Decreasing Intervals_____ Constant Intervals_____

8. On which intervals is the function $g(x) = x^4 - 1.1x^2 - 65.4x + 229.5$ increasing? Give your answer using 3 decimal places. (Calculator OK)

9. Perform the tests to determine whether the function $h(x) = x^4y^2 - 3xy$ is odd, even or neither.

10. Graph a function that meets all of the following:

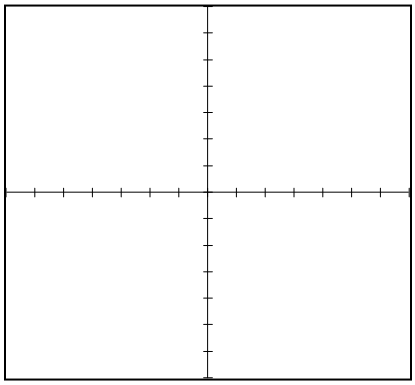
a. $\lim_{x\to\infty} f(x) = 3$

$\lim_{x\to-\infty} f(x) = 3$

$f(0) = -2$

decreases on $(-\infty, 2]$

increases on $[2, \infty)$

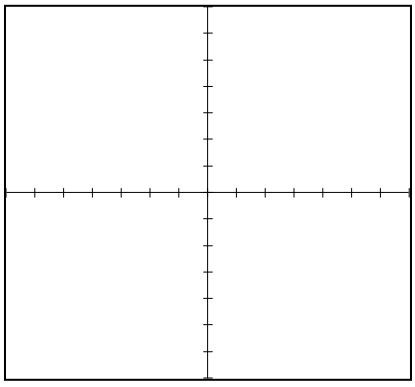


b. $\lim_{x\to\infty} f(x) = \infty$

$\lim_{x\to-\infty} f(x) = -\infty$

$f(-4) = 0$

increases on its entire domain



11-12 Given: $f(x)=x$, $f(x)=x^2$, $f(x)=x^3$, $f(x)=\frac{1}{x}$, $f(x)=\sqrt{x}$, $f(x)=\frac{1}{1+e^{-x}}$

$f(x)=e^x$, $f(x)=\ln x$, $f(x)=\sin x$, $f(x)=\cos x$, $f(x)=|x|$, $f(x)=\text{int}(x)$

11. Which six functions that are increasing on their entire domains?

12. Which three functions have end behavior $\lim_{x\to-\infty} f(x)=0$.

13. Use your graphing calculator to determine all local and absolute extrema and where they occur. Also state if the function is bounded above, bounded below, bounded, or unbounded.

a. $y=x^3-3x$ b. $y=\frac{4x^2}{x^2+4}$ c. $y=(x+1)^2-7$