Precalculus Honors Name_________________

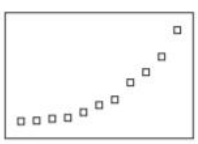
Recap on 1.1-1.3

#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.

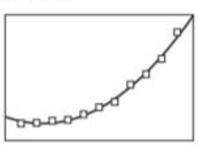
1.

65. (a)



[0, 12] by [640, 3260]

(b) The regression curve is $y = 25.34x^2 - 122.22x + 1117.38$.



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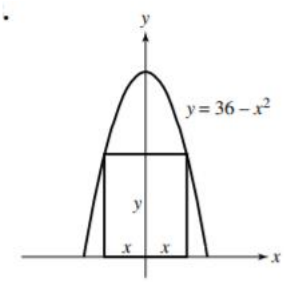
(c) $25.34(16)^2 - 122.22(16) + 1117.38 \approx 5650$ (thousands of barrels)

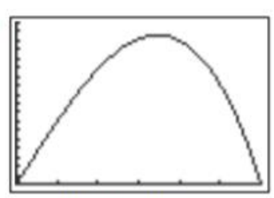
2.



(a) $A = 2xy = 2x(36 - x^2) = 72x - 2x^3$

(b) $36 - x^2 \geq 0$, $(6 - x)(6 + x) \geq 0$, $-6 \leq x \leq 6$. However, $x < 0$ are invalid values, so the domain is $[0, 6]$.

(c)



[0, 6] by [0, 180]

(d) The maximum area occurs when $x \approx 3.46$, or an area of approximately 166.28 square units.

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

$(x+1)^2 = (2\sqrt{x+4})^2$

$x^2+2x+1 = 4(x+4)$

$x^2+2x+1 = 4x+16$

$x^2-2x-15=0$

$(x-5)(x+3)=0$

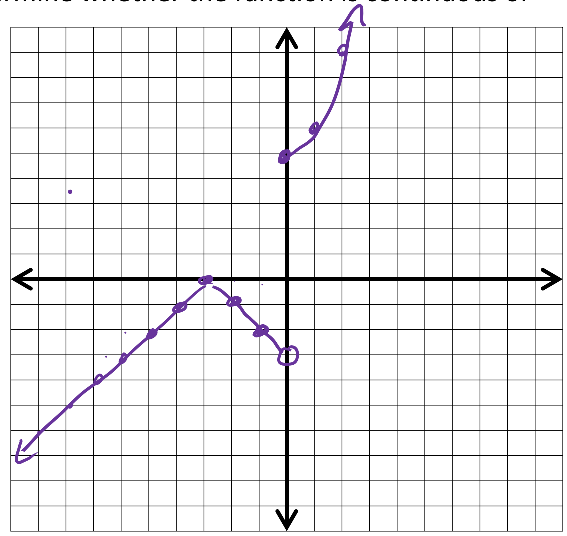
$\boxed{x=5}$ $\cancel{x=-3}$

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

NO

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

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



b. Continuous or discontinuous?

Jump discont.

c. $\lim\limits_{x\to 0^-} f(x) =$ -3 $\lim\limits_{x\to 0^+} f(x) =$ 5

d. $f(0) =$ 5

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

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

$x \ne \frac{1}{2}$ $x \ne -5$

Domain (without a calculator):

$(-\infty, -5) \cup (-5, \frac{1}{2}) \cup (\frac{1}{2}, \infty)$

Range (using a calculator):

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

State all types of discontinuities:

VA: $x=-5$ RD $(\frac{1}{2}, \frac{5}{11})$

Is there a Horizontal Asymptote?

$y = 3$

End behavior: $\lim\limits_{x\to\infty} g(x) =$ 3 $\lim\limits_{x\to-\infty} g(x) =$ 3

Other limits: $\lim\limits_{x\to -5^-} g(x) =$ ∞ $\lim\limits_{x\to -5^+} g(x) =$ $-\infty$

$\lim\limits_{x\to \frac{1}{2}^-} g(x) =$ 5/11 $\lim\limits_{x\to \frac{1}{2}^+} g(x) =$ 5/11

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

Increasing intervals______________ Decreasing Intervals______________ Constant Intervals_______

$(-\infty,-5) \cup (-5,\infty)$

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)

$[-2.610, \infty)$

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

$h(-x) = (-x)^4y^2 - 3(-x)y$

$= x^4y^2 + 3xy$

neither

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

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

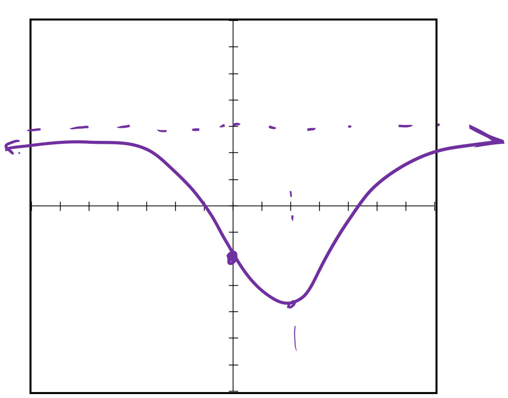
$\lim_{x\to-\infty} f(x) = 3$

$f(0) = -2$

decreases on $(-\infty, 2]$

increases on $[2, \infty)$

answers may vary



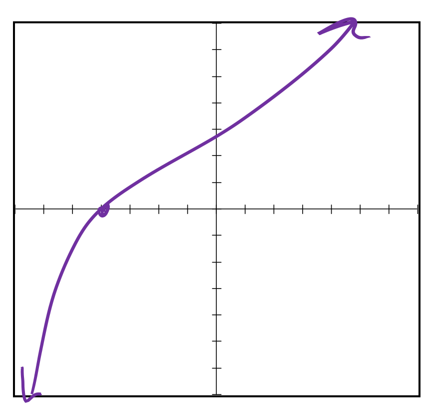
b. $\lim_{x\to\infty} f(x) = \infty$

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

$f(-4) = 0$

increases on its entire domain

answers may vary



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?

$f(x)=x$ $\quad f(x)=x^3$ $\quad f(x)=\sqrt{x}$ $\quad f(x)=e^x$ $\quad f(x)=\ln x$ $\quad f(x)=\frac{1}{1+e^{-x}}$

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

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

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. $y=x^3-3x$

local max of 2 @ $x=-1$

local min of -2 @ $x=1$

no Abs. Extrema

unbounded

b. $y=\frac{4x^2}{x^2+4}$

local & Abs min of 0 @ $x=0$

Bound Above $y=3$

Below $y=0$

$\therefore$ Bounded

c. $y=(x+1)^2-7$

local/Abs min of -7 @ $x=-1$

Bounded Below @ $y=-7$