Welcome to AP Calculus!!!!!!!

Congratulations on enrolling in the most challenging math class offered in high school. Calculus is the study of how things change. The AP version of this course is theory based. In order to do the mechanics of the course it will be very important that you know the theory behind it. You will need to incorporate the theory and the mechanics of the course and then apply that knowledge to questions that you have never seen before. Anything that you ever learned in math might come into play in a question.

The attached assignment is a review of some very important facts and concepts that are used in Calculus. You have done all these topics in the past.

Everything should be done without a calculator since you will not be using a calculator for our first test.

You will need a separate notebook for Calculus. You will NOT be taking notes on your device.

For the first 2 pages please put the work NEATLY in your notebook. For pages 3 and 4 you can work directly on the paper.

Welcome Back!!!!!!!! Review of Pre-Calc
Mrs. Mallon :) :)

1) Determine if each function is odd, even or neither

a) $f(x) = x^4 + x^2 + x$ b) $f(x) = x^{-3}$

c) $f(x) = \frac{x^3}{x^2-1}$ d) $f(x) = \frac{1}{x^2-1}$

2) Using the point slope formula, write the equation of the line passing through the points
A (2,3) B (-1,8)

3) Using the point slope formula, write the equation of the line passing through the points
A (1,-2) B (2,1)

4) Using the point slope formula, write the equation of the line parallel to $2x + y = 4$ and passing through (-2,2).

5) Write the equation of the vertical line passing through (2,-4)

6) Find the domain of

a) $f(x) = \frac{x}{\sqrt{9-x^2}}$ b) $f(x) = 3 - ln(x + 2)$

7) a) Find the x and y intercept of $2x - 3y = 6$
b) Write the equation for the inverse of $f(x) = 3x - 2$

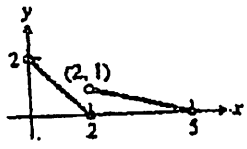
8) Rewrite each expression using a rational non-negative exponent.

a) $\frac{4}{\sqrt[3]{(2x-1)^{-2}}}$ b) $5\sqrt{3x^2 + 4}$

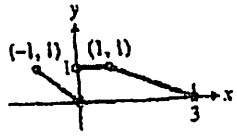
9) Rewrite each expression using a radical sign and no negative exponents

a) $2(3x + 5)^{-\frac{3}{2}}$ b) $\frac{-3}{(x-2)^{\frac{1}{2}}}$

10) Write the function equation for the accompanying piecewise graph



11) Write the function equation for the accompanying piecewise graph



12) **Condense to a single ln:**

a) $3lnx - 2ln(x+3)$ b) $ln(x+1) + ln(x-1)$

13) **Algebraically solve for x. Answers should be left in terms of e or ln if necessary.**

a) $2 - 3^{-x} = -1$ b) $e^x - 5 = 0$ c) $\ln x + 2 = 8$ d) $2 + 3e^{4x} = 11$

14) **Expand using the laws of logs:**

a) $ln\left(\frac{x}{x+2}\right)$ b) $ln\left(\frac{4x}{(x+3)^2}\right)$

15) **Solve for x in radian measure:**

a) Tan x + 1 = 0, $\frac{\pi}{2} < x < \frac{3\pi}{2}$

b) $2sin^2x + sinx - 1 = 0 \quad 0 \leq x \leq 2\pi$

c) $e^{2x}cosx = 0, \quad 0 \leq x \leq 2\pi$

16) **State the parent function and the shifts (HIVO) on each graph without using a calculator.**

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

17) **Rewrite each equation as a piecewise function.**

a) $y = |x|$ b) $y = |x - 5| + 2$ c) $y = |2x + 1| + 4$

18) **Given** $f(x) = \frac{(x+1)(x-3)(x+5)^2}{(x-3)(x+2)^2(x-4)^3}$

a) **Determine if f(x) has any holes in the graph. If yes, determine exactly where the hole would be.**

b) **Find all vertical asymptotes. Are those asymptotes odd or even and what does that mean?**

c) **Find all roots. Are those roots odd or even and what does that mean?**

d) **Find any horizontal asymptotes.**

e) **Make a sketch.**

Do You Know these trig facts??

1) $\sin^2 A + \cos^2 A =$ _____

2) $1 - \sin^2 A =$ _____

3) $1 - \cos^2 A =$ _____

4) $\frac{\sin x}{\cos x} =$ _____

5) $\frac{\cos x}{\sin x} =$ _____

6) $\frac{1}{\sin x} =$ _____

7) $\frac{1}{\cos x} =$ _____

8) $2\sin x \cos x =$ _____

9) The graph of $\sin x$ is symmetric about _____

10) The graph of $\cos x$ is symmetric about _____

11)

	0	$\pi/6$	$\pi/4$	$\pi/3$	$\pi/2$	π	$\frac{3}{2}\pi$	2π
Sin								
Cos								
Tan								
Cot								
Sec								
Csc								

11) $\cos^2 x - \sin^2 x =$ _____

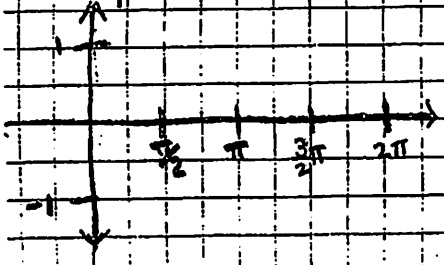
12) $1 - 2\sin^2 x =$ _____

13) $2\cos^2 x - 1 =$ _____

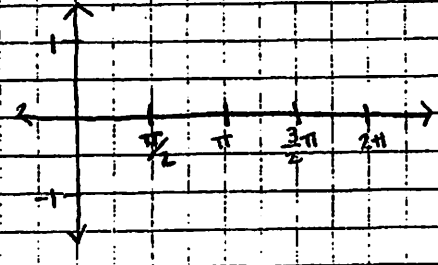
14) $1 - \sin^2 x =$ _____

15) $1 - \cos^2 x =$ _____

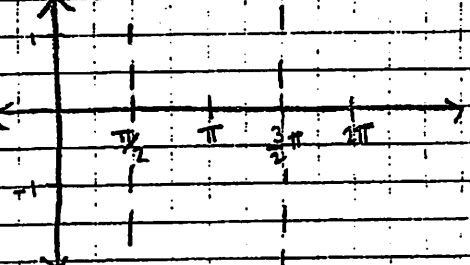
12) $y = \sin x$



13) $y = \cos x$

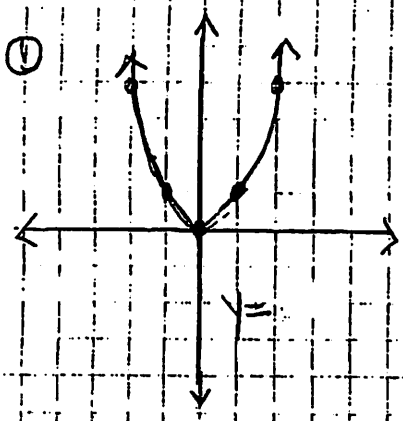


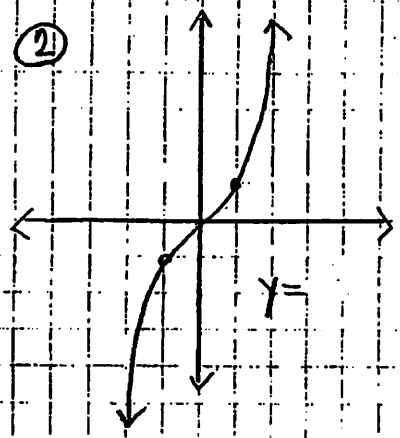
14) $y = \tan x$

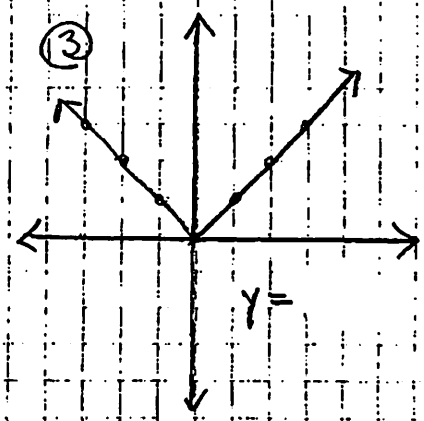


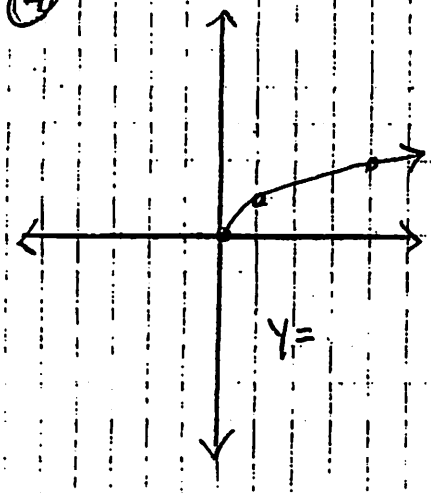
Library of Basic Parent Functions

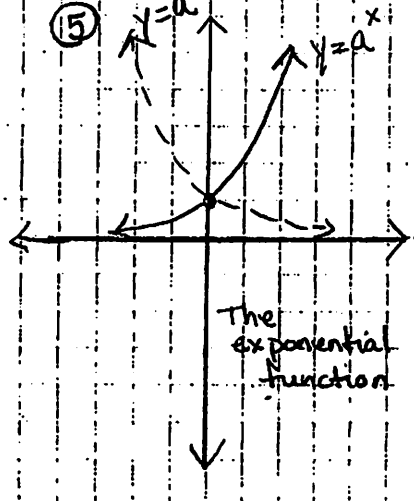
Identify each Basic function

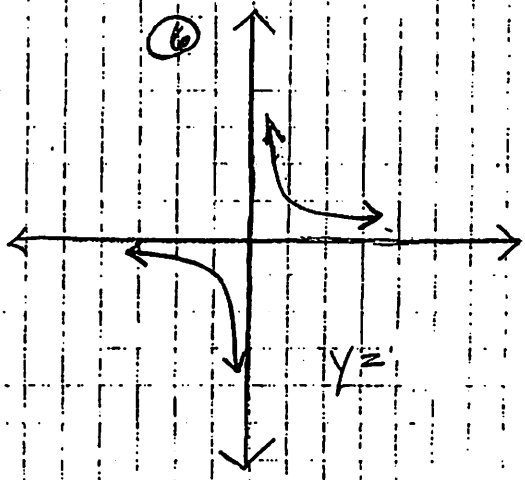
① 

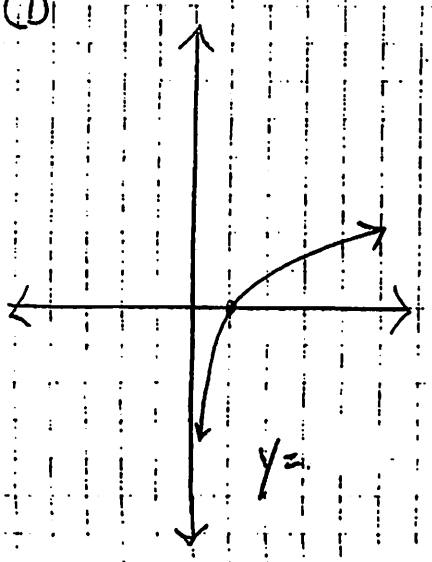
② 

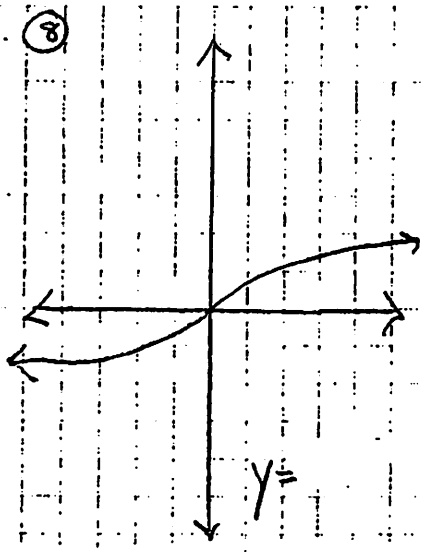
③ 

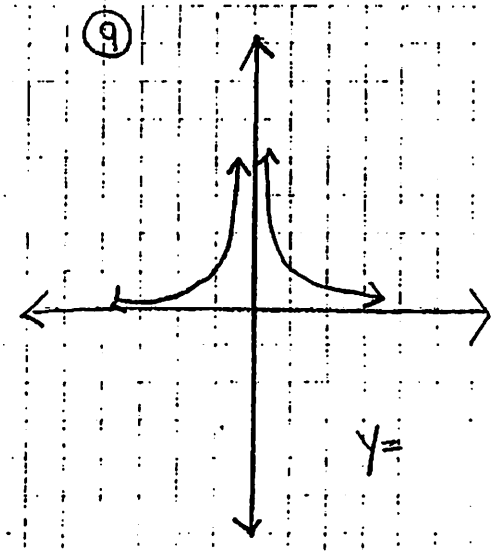
④ 

⑤ 

⑥ 

⑦ 

⑧ 

⑨ 

Holes, Poles, Zeros and End Zones

Holes: A hollow circle on a graph. Holes are found where the denominator equals zero in a reducible term.

Poles: These are vertical asymptotes. Graphs never cross or touch a vertical asymptote. Poles are found where the denominator equals zero in a non-reducible term.

Even Asymptotes	**vs.**	**Odd Asymptotes**
The term has an even exponent		The term has an odd exponent
The graph will go in the same direction on each side of the asymptote		The graph will go in opposite directions on each side of the asymptote

Zeros: Also known as Roots. This is where the graph will hit the x axis. Zeros are found where the numerator equals zero in a non-reducible term.

Even Roots	**vs.**	**Odd Roots**
The term has an even exponent		The term has an odd exponent
The graph will be tangent to the x axis		The graph will cut through the x axis

End Zones: These are horizontal asymptotes. It is where the graph levels off as you go to ∞ or $-\infty$. This is determined by comparing the degree of the top and bottom of the rational expression.

$\frac{\text{Small degree}}{\text{Large degree}} \Rightarrow$ y = 0 is the horizontal asymptote

$\frac{\text{Large degree}}{\text{Small degree}} \Rightarrow$ No horizontal asymptote

$\frac{\text{Same degree}}{\text{Same degree}} \Rightarrow$ y = the ratio of the leading coefficients is the horizontal asymptote