Math 113
Exam #2
(Chapter 3-Derivatives)
Due: Beginning of class July 30,2007

1) Let $f(x) = \frac{5}{\sqrt{x}}$

a) Find the derivative of f(x) using the limit process.

b) Find the derivative of f(x) using the basic differentiation rules (Make sure this is the same as part a)

c) Evaluate the slope of the tangent line to f(x) at the point (4,5/2)

2) An airplane drops humanitarian aid. When pushed from the plane, the altitude of the package is given by $h(t) = -16t^2 - t + 30{,}000$

a. What is the instantaneous velocity of the package after 10 seconds?

b. How long does it take the package to reach earth?

c. What is instantaneous velocity when the object hits the ground?

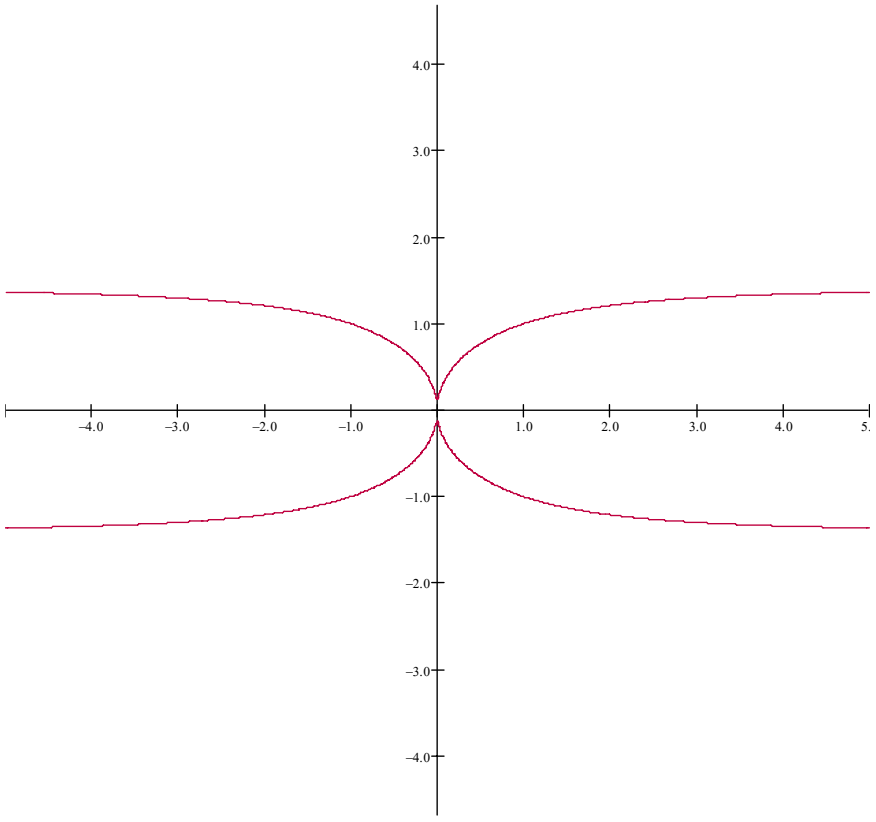
d. What is the packages acceleration when it hits the ground?

3) For the function $g(x) = \arctan(x)$:

a) Find an equation for the tangent line to $g(x)$ at the point $(-1,\pi/4)$

b) Sketch a graph of $g(x)$ and the line that you found in part a.

4) Consider the kappa curve: $y^2(x^2 + y^2) = 2x^2$

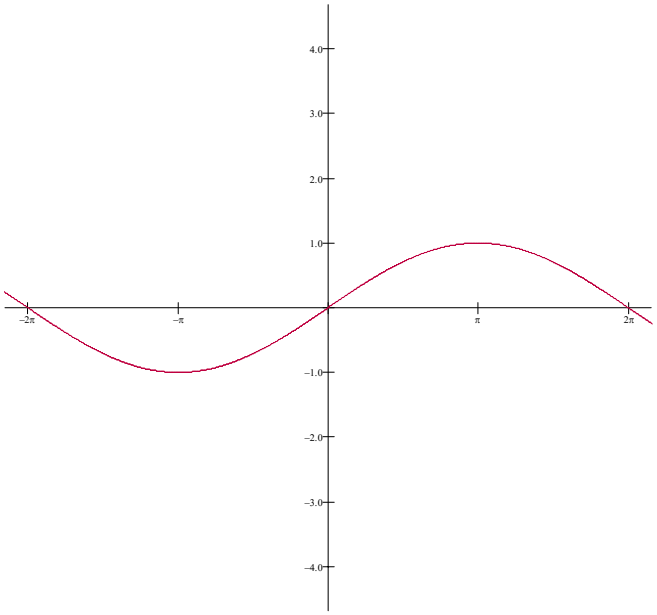


a) Find the equation of the tangent line to the graph at the point (-1,-1)

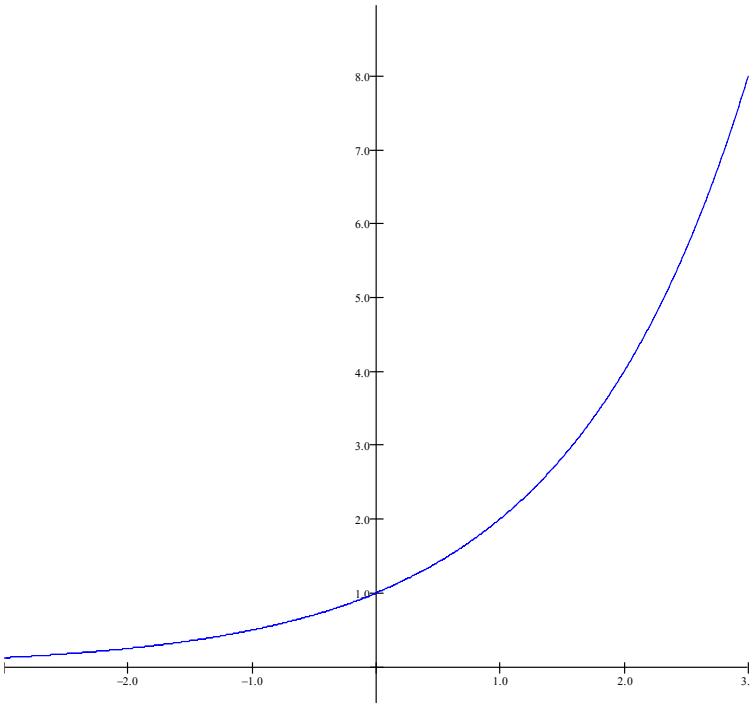
b) Include the line determined in part a to the graph above.

5) Find $\frac{dy}{dx}$ using logarithmic differentiation where $y = \frac{(x+1)(x+2)}{(x-1)(x-2)}$

6) Find the slope of the tangent line to f(x)=sin(x/2) at the origin. Include it in the graph below.



7) Find the slope of the tangent line to $f(x) = 2^x$. at the point (0,1) Include it in the graph below.



I pledge all work on this exam was done by me without the assistance of my classmates or any other individual. I realize that by cheating I am wasting both my time and money.
Signature_____