

- 1) Compute the second derivative of the function.  $f(x) = \frac{1}{x^{3/2}} + e^x + \sqrt{x}$
- 2) Compute the derivative of the function  $g(t) = t^3 e^t$ . Where does the graph of  $g(t)$  have horizontal tangents, if any at all?
- 3) What is the derivative of the function  $f(x) = \frac{\sin x - \cos x}{e^x}$ ?
- 4) What is the derivative of the function  $s(t) = \sec t \tan t$ ?
- 5) **Using the limit definition of the derivative** determine  $f'(x)$  for  $f(x) = 3x^2 - x^{-1}$ . You should check your answer using the power rule.

Compute the derivative of the following functions:

- 6)  $g(t) = \frac{t^4 + 1}{t^4 + 3}$
- 7)  $f(x) = (x^2 + 1) \sin x + (x^2 + 4) \cos x$
- 8) What is the slope-intercept form for the equation of the line tangent to the graph of  $f(x) = x^3 + 2x + x^4$  at  $x = 1$ ?
- 9) We are mixing a 6.4% HCL solution by combining a 5.4% HCL solution with a 7.6% solution.  
a) **Write down an equation** that will determine how much 5.4% solution should be mixed with 1000cc's of the 7.6% solution to obtain the 6.4% solution.  
b) Solve the equation in part a and determine how much 5.4% solution is actually needed.
- 10) Graph the function  $f(x) = 2x - x^2 + 3$  on the interval  $[-3, 4]$  below indicating scales, and labeling the vertex and all intercepts as well as end-points.