

The purpose of this lab is a quick review of some derivatives and algebra. For this lab, you may work with others but you will turn in your own work. Pencil only. This lab is due Friday, of Week 1. I will give a 5% bonus for all correct answers on labs turned in on time and you will be able to make corrections on wrong answers next week to resubmit. Late work will be reduced by 25%, accepted up to a week late (by Friday, Week 2), and no corrections can be made after it's graded. It will be graded on completeness, neatness, as well as accuracy. **Show correct work, in pencil, on a separate paper and staple it to this one, please write only the answers here:**

Find the derivative of the following functions. Make sure to reduce any fractions, no negative exponents in your final answer, and convert any fractional exponents back into radicals.

1. (6pts) $f(x) = x^{-2} - 2x^{-1} + 3x^3$

2. (6pts) $f(x) = x^2\sqrt{2x-2}$

3. (6pts) $y = \frac{e^{x^2}}{2x}$

4. (6pts) $y = (\cos x)(\tan x)$

5. (6pts) $f(x) = \frac{\csc x}{\sin x}$

6. (6pts) $h(x) = \frac{x^2 - 4x + 5}{2x}$

7. (12 pts) If $f(x) = x^3 \ln(3x)$ find $f''(x)$, the second derivative. Copy your work neatly here:

8. (12 pts) Derive the derivative of $y = \arctan(x)$. Recall that $\arctan(x) = \tan^{-1}(x)$; use a reference right triangle (with y representing an acute angle in the triangle) to help find the derivative and implicit differentiation, show your work neatly here. The derivative must be in terms of x .