

Math 114 Fall 2019
Calculus I HW 5
Due Wednesday, March 6

For this homework you may compute derivatives using any tools we have developed in class.

1. Stewart 2.1.10
2. Stewart 2.1.12
3. Stewart 2.1.46
4. Stewart 2.1.48
5. Stewart 2.3.52
6. Stewart 2.3.56
7. Stewart 2.4.50
8. Stewart 2.4.54
9. Stewart 2.5.64
10. Stewart 2.5.66
11. Verify that $f(x) = \sin(x^2)$ is a solution to the differential equation $y'' = y'/x - 4x^2y$.
12. Suppose $f(x) = ax^2 + bx + c$ satisfies $f(2) = 1$, $f'(2) = 2$, $f''(2) = 3$. Find $f(x)$.
13. Prove that $f(x) = \sin(x) + x^2$ satisfies $f''(x) + f(x) = x^2 + 2$.
14. Suppose the rate at which the concentration of a drug in the bloodstream decreases is proportional to the current concentration. Write a differential equation to express this model, and write a sentence or two explaining what each variable means and how the equation models this scenario.
15. Suppose the rate at which an epidemic spreads through a community is jointly proportional to the number of people who have caught the disease and to the number of people who have not. Write a differential equation to express this model, and write a sentence or two explaining what each variable means and how the equation models this scenario.
16. Suppose the rate at which people hear about a piece of news is proportional to the number of people who have *not* heard about it. Write a differential equation to express this model, and write a sentence or two explaining what each variable means and how the equation models this scenario.