

Name: \_\_\_\_\_

Homework 3 | Math 256 | Cruz Godar

*Due Wednesday of Week 4 at the start of class*

Complete the following problems and submit them as a pdf to Canvas. 8 points are awarded for thoroughly attempting every problem, and I'll select three problems to grade on correctness for 4 points each. Enough work should be shown that there is no question about the mathematical process used to obtain your answers.

### Section 3

In problems 1–3, find the indicated derivative.

1.  $\frac{\partial}{\partial t} [2ty + \sin(t)] .$

2.  $\frac{\partial}{\partial y} [\sin(xy^x)] .$

3.  $\frac{\partial}{\partial x} [\sin(xy^x)] .$

4. Using the multivariable chain rule, find  $\frac{df(x,y)}{dt}$ , where  $f(x,y) = 2x^2 + \sec(xy^2)$ ,  $x(t) = t$ , and  $y(t) = 5t^2$ .

In problems 5–7, find the indicated integral. Make sure to express the constant as a function of the correct variable.

5.  $\int f(x,y) \, dx$  for  $f(x,y) = 2x \cos(y-x)$ .

6.  $\int f(x,y) \, dy$  for  $f$  as in the previous problem.

7.  $\int g(x,y) \, dy$  for  $g(x,y) = e^{x^2}$ .

In problems 8–14, solve the the given DE.

8.  $2y + 1 + (2x + 1)y' = 0$ ,  $y(1) = 1$ .

$$9. 1 - \sin(t + y) + y'(-\sin(t + y)) = 0, y(0) = 0.$$

$$10. \sin(y)y' - te^t \cos(y) = 0.$$

$$11. y' = -\frac{yx^{y-1}}{x^y \log(x)}, y(2) = 1.$$

$$12. ty' + y + t^{-2} = 0, y(2) = 2.$$

$$13. (10t + t^2) - 2\sin(y)y' = 0, y(0) = 1.$$

$$14.$$

$$\sec^2(x)\sec(y) + \left(\tan(x)\tan(y)\sec(y) + \frac{1}{y}\right)y' = 0.$$