

## Math 201 Quiz 8B

October 16, 2019

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

Instructions: No calculators. Use your own scrap. Write your fully simplified answers in the space provided.

1. Assuming existence, state the equation that defines the derivative of  $f(x)$ : \_\_\_\_\_

2. State the equations in the following rules:

(a) Power rule: \_\_\_\_\_ (b) Product rule: \_\_\_\_\_

(c) Quotient rule: \_\_\_\_\_ (d) Chain rule: \_\_\_\_\_

3. Complete the following formulas, assume  $u$  is a function of  $x$ :

(a)  $\frac{d}{dx} a^u =$  \_\_\_\_\_ (b)  $\frac{d}{dx} \ln u =$  \_\_\_\_\_ (c)  $\frac{d}{dx} e^u =$  \_\_\_\_\_

(d)  $\frac{d}{dx} \cos x =$  \_\_\_\_\_ (e)  $\frac{d}{dx} \sin x =$  \_\_\_\_\_ (f)  $\frac{d}{dx} \log_a x =$  \_\_\_\_\_

4. Differentiate:

(a)  $\frac{d}{dx} x \sin x =$  \_\_\_\_\_ (b)  $\frac{d}{dx} \frac{\ln x}{x} =$  \_\_\_\_\_

(c)  $\frac{d}{dx} \sqrt{x^7 + e^x} =$  \_\_\_\_\_

(d)  $\frac{d}{dx} (e^{\ln x} + \sin^2 x + \cos^2 x) =$  \_\_\_\_\_

**Bonus:**

1. Differentiate:  $\frac{d}{dx} \sec x =$  \_\_\_\_\_

2. Differentiate:  $\frac{d}{dx} \cos^2 x =$  \_\_\_\_\_

3. Differentiate:  $\frac{d}{dx} \ln \sqrt{\frac{e^x x^5}{(x+4)^3}} =$  \_\_\_\_\_

4. If  $x^3 y^2 - 3x^2 + 2y = \ln x + 4$ , find  $\frac{dy}{dx} =$  \_\_\_\_\_