

Math 212-RS2 Quiz 1

January 28, 2020

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

Instructions: Answer all problems in the space provided! No calculators! Use your own scrap paper.

1. State the following rules (as equations); using  $f$  and  $g$  (functions of  $x$ ) to illustrate:

(a) The product rule: \_\_\_\_\_ (b) The power rule: \_\_\_\_\_

(c) The quotient rule: \_\_\_\_\_ (d) The chain rule: \_\_\_\_\_

(e)  $\frac{d}{dx} e^u =$  \_\_\_\_\_ (f)  $\frac{d}{dx} \tan^{-1} x =$  \_\_\_\_\_

2. Compute the limits:

(a)  $\lim_{x \rightarrow 2} \frac{x^3 - 4x}{2 - x} =$  \_\_\_\_\_ (b)  $\lim_{x \rightarrow \infty} \frac{2x^3 - 5x + 1}{4 - 3x^3} =$  \_\_\_\_\_ (c)  $\lim_{x \rightarrow 0} \frac{x \cos 3x}{\sin 4x} =$  \_\_\_\_\_

3. Differentiate:

(a)  $y = \frac{5x^2 + \sin x}{\pi}$  \_\_\_\_\_ (b)  $y = \ln \frac{2x}{\sqrt{x+8}}$  \_\_\_\_\_

(c)  $y = 4x^5(2x + 1)^7$  \_\_\_\_\_

4. Integrate:

(a)  $\int \frac{4x^2 - 4x + 1}{x^{3/2}} dx =$  \_\_\_\_\_ (b)  $\int \sin(\cos x) \sin x dx =$  \_\_\_\_\_

(c)  $\int x \sin(x^2) dx =$  \_\_\_\_\_ (d)  $\int \frac{1}{x \ln x} dx =$  \_\_\_\_\_

5. Sketch the following functions (do a mini sketch under the function's name, label intercepts):

(a)  $y = \cos x$   
(principal period)

(b)  $y = x^3$

(c)  $y = x^2$

(d)  $y = x^3 - 4x$