MATH 141: QUIZ 6 SECTIONS 3.8 AND 3.9

ANN CLIFTON
UNIVERSITY OF SOUTH CAROLINA

Name: SOLS

No phone or calculator. You must show all work to receive full credit. Be sure to make reasonable simplifications.

1. **(4 points)** Use logarithmic differentiation to find $\frac{dy}{dx}$:

$$y = x^{\sin x}$$

$$\ln y = \sin x \ln x$$

$$\frac{1}{y}\frac{dy}{dx} = \cos x \ln x + \sin x \cdot \frac{1}{x}$$

$$\frac{dy}{dx} = y\left(\cos x \ln x + \frac{\sin x}{x}\right)$$

$$\frac{dy}{dx} = x^{\sin x}\left(\cos x \ln x + \frac{\sin x}{x}\right)$$

Date: March 7, 2018.

2. **(4 points)** Differentiate the following function:

$$f(x) = \arctan(3x^5)$$

$$f'(x) = \frac{1}{1+(3x^5)^2} \cdot (3x^5)'$$

$$= \frac{15x^4}{1+9x^{10}}$$

$$(\arctan(u))' = \frac{1}{1+u^2}\frac{du}{dx}$$

Here, $u = 3x^5$

3. **(2 points)** What are you looking forward to over spring break?

Going to the beach and relaxing!