MATH 5B - Single Variable Calculus II — Spring 2019

§6.4 Derivatives of Logarithmic Function

In-class Activity 6.4

Dr. Jorge Basilio

Pasadena City College

gbasilio@pasadena.edu

Activity 1: Derivative of Natural Logarithm

Find the derivatives of the following functions:

(a) $h(x) = x^2 \ln(x)$ (b) $p(t) = \frac{\ln(t)}{e^t+1}$ (c) $s(y) = \ln(\cos(y) + 2)$ (d) $z(x) = \tan(\ln(x))$ (e) $m(z) = \ln(\ln(z))$

Activity 2: Derivative of Natural Logarithm

Find the derivative of $f(x) = \ln\left(\frac{2x+1}{\sqrt{x+6}}\right)$ in two ways:

(a) using derivative rules directly

(b) by using the properties of log to simplify before you apply derivative rules

(c) Which method do you prefer?

(d) Find as many pros/cons of each method.

Activity 3: Anti-derivatives of $1/x$

(a) Evaluate: $\int \frac{2}{x}\,dx$

(b) Find the area under the hyperbola $xy = 2$ from $x = 1$ to $x = 2$. Round your answer to three decimal places.

(c) Compute: $\int \frac{2x}{x^2+4}\,dx$

(d) Find: $\int_1^e \frac{\ln(x)}{x}\,dx$

(e) What is $\int \tan(x)\,dx$?

Activity 4:

(a) If $y = \log_{10}(1 + x + \tan(x))$, find y'

(b) Compute: $\frac{d}{dx}[10^{x^2}]$

(c) Evaluate: $\int_0^4 3^x \, dx$

Activity 5:

Use Log Diff to find the derivatives of

(a) $y = \dfrac{x^{3/4}\sqrt{x^2+1}}{(3x+5)^5}$

(b) $y = x^x$