Calculus One: Section 5.5 – Derivatives and Integrals of Other Bases

Given $f(x) = a^u$, then $f'(x) = (\ln a) a^u \, du$

Likewise, $\int a^u \, du = \frac{1}{\ln a} a^u + C$

Given $f(x) = \log_a u$, then $f'(x) = \frac{du}{(\ln a)u}$

A. Evaluate the derivative of the following functions.

1) $y = 7^{(3x^2+2)}$

2) $y = \log_3(2x - 6)$

3) $f(x) = \frac{3^{2x}}{x}$

4) $y = 5^{\frac{x}{2}} \sin(2x)$

5) $y = \log_3 \left( \frac{x\sqrt{x} - 1}{2} \right)$
6 – 8. Determine the following integrals.

6) \[ \int 5^{-x} \, dx \]

7) \[ \int (3 - x)7^{(3-x)^2} \, dx \]

8) \[ \int_3^4 e^{(3-x)} \, dx \]

Extensions:

9) Write the equation of the line tangent to \[ f(x) = \log(2x) \] at the point (5,1)

10) Given \[ f(x) = x^{3x} \] determine \[ f'(x) \] Hint: Take the ln of both sides (pg 363 example 5d)

Homework 5.5: Odd problems from 37 – 47 and 61 – 65, and 49, 53, 55