Transition-hw9

(1) Calculate the second derivative of
   (a) $f(x, y, z) = (x + e^{yz})^3$
   (b) $f(A) = \det(A)$ but here at the points $x_0 = 1$.

(2) Consider the Banach space $X = C[0, 1]$ and the function $f : [0, 1] \to C[0, 1]$ defined by

$$f(t)(s) = e^{ts}$$

Calculate

$$\int_0^1 f(t)dt \, .$$

(3) Find the derivative of $f(t, s) = \int_0^t \sqrt{1 + u^2 t^2 s^2} du$. (Feel free to interchange differentiation and integration we will discuss the assumptions needed for that in class.)