Assignment 4 (Due on the week October 5 – October 10)

1. Find $f'_x(x, b)$, if $f(x, y) = x + (y - 1) \arcsin \sqrt{\frac{x}{y}}$.

2. Find all partial derivatives of the following function: $u = \left(\frac{x}{y}\right)^z$.

3. Find all partial derivatives of the following function: $u = xyze^{x+y+z}$.

4. Find the total differential of the following function: $u = \ln(x^x + y^y + z^z)$.

5. Use differentials to approximate each of the following values of $f(x, y)$ at a given point. Show all necessary calculations that are to be done if no calculator is available.

   (a) $f(x, y) = x^4 + 2x^2y^2 + xy^4 + 10y$ at $x = 10.36$ and $y = 1.04$;

   (b) $f(x, y) = 6x^{2/3}y^{1/2}$ at $x = 998$ and $y = 101.5$;

   (c) $f(x, y, z) = \sqrt{x^{1/2} + y^{1/3} + 5z^2}$ at $x = 4.03$, $y = 7.95$ and $z = 1.02$.