Homework/ Partial Derivatives

Q1/ Evaluate ***dw/dt*** by using the Chain Rule if

$$\boldsymbol{w = 2ye^{x} - \ln z, \quad x = \ln(t^2 + 1), \quad y = \tan^{-1} t, \quad z = e^{t}, \quad t = 1}$$

Q2/ Express **dw/dt** as a function of t, both by using the **Chain Rule** and by expressing w in terms of t and differentiating directly with respect to **t**.

$$w = \ln(x^2 + y^2 + z^2), \quad x = \cos t, \quad y = \sin t, \quad z = 4\sqrt{t}, \quad t = 3$$

Q3/ Evaluate $\frac{\partial z}{\partial u}$ and $\frac{\partial z}{\partial v}$ at the given point $(\boldsymbol{u}, \boldsymbol{v})$ for

$$\boldsymbol{z = 4e^{x}\ln y \quad , \quad x = \ln\big(u\cos(v)\big) \quad , \quad y = u\sin(v)\ ; \quad (u, v) = (2, \frac{\pi}{4})}$$

Q4/ Find all the local maxima, local minima, and saddle points of the function:

$$\boldsymbol{f(x, y) = x^3 - y^3 - 2xy + 6}$$

Q5/ Find the derivative of the function:

$$\boldsymbol{f(x, y) = \cos(xy) + e^{yz} + \ln(zx)}$$

at **Po(1,0,1/2)** in the direction of **A=i+2j+2k**

Q6/ Find the absolute maxima and minima of the function:

$$\boldsymbol{f(x, y) = x^2 - xy + y^2 + 1}$$

on the closed triangular plate in the first quadrant bounded by the lines x = 0, y = 4, y = x

Q7/ Find the derivative of the function:

$$\boldsymbol{f(x,y) = 3e^{x}cos(yz)}$$

at **Po(0,0,0)** in the direction of **A=2i+j-2k**

Q8/ Find the absolute maxima and minima of the function:

$$\boldsymbol{f(x,y) = x^2 + xy + y^2 - 6x + 2}$$

on the rectangular plate

$$\boldsymbol{0 \leq x \leq 5 \quad , \qquad -3 \leq y \leq 0}$$