MATH 2010E   HW 7 (Self-study , no need to hand-in)

(Refer to Textbook : Thomas' Calculus , Early Transcendentals 13th Ed)

§14.8 : Q 8 , 12 , 16, 17 , 24 , 34, 37 ,44 ,

Additional questions :

(1)   Consider system of equation

$$\begin{cases} 2X - y + Z = 0 \\ e^{2X} + e^{-2y} + \sin Z = 2 \end{cases}$$

which has a solution $(x, y, z) = (0, 0, 0)$.

Is (X, y) can be solved as functions of z, $X = X(z)$ & $y = y(z)$,
near this point $(0, 0, 0)$?

If so, calculate the derivatives $\frac{dx}{dz}$, $\frac{dy}{dz}$ at the point .

(2)   Let $f(x, y) = \begin{pmatrix} X^3 - 3Xy^2 \\ 3X^2 y - y^3 \end{pmatrix}$

Show that for $(X, y) \neq (0, 0)$, f has a local inverse.

(End)