

1

$$W = x^3 y^3 + x^3 + y^3 + 1$$

$$W_x = 3x^2(y^3 + 1)$$

$$W_y = 3y^2(x^3 + 1)$$

$$W_{xx} = 6x(y^3 + 1) = A$$

$$W_{xy} = 6x^2 y^2 = B$$

$$W_{yy} = 6y(x^3 + 1) = C$$

$$W_x = 0 \rightarrow x = 0 \text{ or } y = -1$$

$$W_y = 0 \rightarrow (0, 0) \text{ and } (-1, -1) \text{ are critical points.}$$

$$(0, 0): A - B^2 = 0 \rightarrow \text{Can't Conclude}$$

$$(-1, -1): A - B^2 = -8 < 0 \rightarrow \text{Saddle}$$