

# ENGR222 Assignment 2

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1. The following questions are concerned with the function

$$f(x, y) = -2x^3 + 3x^2y + 2y^3 - 9y + 5$$

- (a) Determine the first order partial derivative of  $f(x, y)$

$$\begin{aligned}f_x &= -6x^2 + 6xy \\f_y &= 6y^2 + 3x^2 - 9\end{aligned}$$

- (b) Determine the second order partial derivatives of  $f(x, y)$

$$\begin{aligned}f_{xx} &= -12x + 6y \\f_{yy} &= 12y \\f_{xy} &= 6x\end{aligned}$$

- (c) Find all of the critical points of  $f(x, y)$

- (d) Classify the critical point  $(0, \sqrt{\frac{3}{2}})$

2. Quick questions

- (a)
- (b)
- (c)
- (d)

3. Double Integrals

- (a)
- (b)
- (c)
- (d)