

MATH 280 – QUIZ #2

Name: Kevin

Directions: Please show all work for maximum credit. This quiz is worth 14 points. Good luck!

1. Find $f_{xx}, f_{xy}, f_{yx}, f_{yy}$: Given $f(x, y) = x^3 \sin(2y)$. Determine the following.

(1 point) a. $f_x = 3x^2 \sin(2y)$

(1 point) b. $f_y = 2x^3 \cos(2y)$

(1 point) c. $f_{xx} = 6x \sin(2y)$

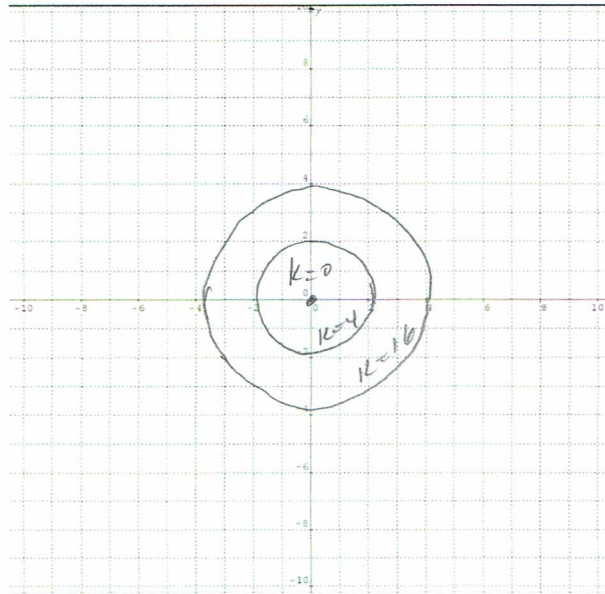
(1 point) d. $f_{xy} = 6x^2 \cos(2y)$

(1 point) e. $f_{yy} = -4x^3 \sin(2y)$

(3 points) 2. Find the following limit: $\lim_{\substack{(x,y) \rightarrow (1,1) \\ x \neq 1}} \frac{xy - y - 2x + 2}{x - 1}$

$= \lim_{x \rightarrow 1} \frac{y(x-1) - 2(x-1)}{x-1} = \lim_{x \rightarrow 1} \frac{(x-1)(y-2)}{x-1} = \lim_{x \rightarrow 1} (y-2) = 1-2 = -1$

(3 points) 3. Given the following function: $f(x, y) = x^2 + y^2$. Sketch the function's level curves when $k = 0$, $k = 4$, and $k = 16$.



(3 points) 4. Find the equation of the tangent plane at the point $P_0(1, -2, 1)$ on the surface $z = 3x^2 - y^2 + 2x$.

$$f_x = 6x + 2 \quad f_y = -2y$$

$$f_x(1, -2) = 8 \quad f_y(1, -2) = 4$$

$$z - 1 = 8(x - 1) + 4(y + 2)$$

$$z - 1 = 8x - 8 + 4y + 8$$

$$z = 8x + 4y + 1$$