

Math 2204: Written HW 4 (Due Friday 2/21, 5pm)

No calculator or other electronic devices for written HWs.

Hand in all work and reasoning for the following problems

■ **Section 14.1:** 61, 63.

■ **Section 14.2:** 10, 22, 26, 49, 50.

For #50 you may assume that there are no other points than $(0, 0)$ where f is discontinuous.

■ **Section 14.3:** 2b, 13, 18, 37, 58.

■ **Section 14.4:** 7, 18 (linearization only), 28. Include the formula you used for each problem.

A) Compute the limit, if it exists, or show that the limit does not exist.

$$1. \lim_{(x,y) \rightarrow (0,0)} \frac{x^5 + xy^2}{x^4 + y^2} \quad 2. \lim_{(x,y) \rightarrow (0,0)} \frac{xy^2}{x^2 + y^2} \quad 3. \lim_{(x,y) \rightarrow (0,0)} \frac{xy^2}{x^2 + y^4}$$

B) Find the **first** partial derivatives of

$$1. f(u, v) = v(u^2 + v)^6 \quad 2. f(x, y, z) = x \cos(y^2) + yz$$

C) Find all **second** partial derivatives of $f(x, y) = \frac{x}{y^2}$ at the point $(2, 1)$.

D) Let $f(x, y) = e^{xy-2}$.

1. Find the tangent plane equation to the graph of f at the point where $x = 2$ and $y = 1$.
Include the formula you used.
2. Find the linearization of f at $(2, 1)$. Include the formula you used.
3. Use your linearization of part 2 to approximate $f(2.1, 0.8)$.