Instructor: Alfred Noël Homework I Due September 30

- Use an (ε, δ) type proof to show that
 f(x, y, z) = 5 is continuous on ℝ³
 ii. Any linear transformation from ℝⁿ to ℝ^m is continuous on ℝⁿ.
 iii. lim_{(x,y)→(0,0)} x²/√(x²+y²)</sup> = 0
- 2. Does the limit of the following functions exist as $(x,y)\to (0,0)$ i. $\frac{x^2}{x^2+y^2}$ ii. $\frac{x^2y}{x^2+y^2}$
- 3. Compute the Derivative of the following functions:
 i. f(x, y) = (x² + cos y, ye^x)
 ii. f(x, y, z) = (ze^x, -ye^z)
 Are these two functions differentiable on their domain?
- 4. Find a linear approximation of $f(x, y, z) = xe^y + z 1$ at (1, 1, 1).
- 5. Do number 48 on page 134.