Worksheet 2/26/2025

1) Draw vectors u = (3, 1) and v = (2, -1). Then find the length of u and v, the dot product $u \cdot v$, and the angle between them.

2) Let $f(x, y) = \frac{y}{x^2 + y}$.

(a) Find the gradient vector of f.

(b) Find the the gradient vector of f at (x, y) = (1, 2).

(c) Find the rate of change of f in the direction of vector v = (3, -4) at (x, y) = (1, 2).

(d) At the point (1, 2), in what direction does f have the maximum rate of change? What is this maximum rate of change?