MA 234-01 §3.4–3.6	**Quiz #2**	*score*	**Name:** _____ **11 April 1997**

1. Let $f(x, y) = \dfrac{1}{\sqrt{x^2 + y^2}}$.

   (a) Find the gradient of f, ∇f. *(6 points)*

   (b) Find the rate of change of f at the point $(3, 4)$ in the direction straight into the origin. *(6 points)*

2. The volume of a right circular cone is given by $V = \frac{\pi r^2 h}{3}$ where r is the base radius and h is the height. Suppose r and h are functions of time so that the radius in increasing at a constant rate of 2 inches per minute and the height is decreasing at a constant rate of 1 inch per minute. Use a chain rule to compute the rate of change of the volume of the cone with respect to time when the radius is 5 inches and the height is 15 inches. *(8 points)*