Math 2110Q - Multivariable Calculus **Section 14.1-14.2 Worksheet**
Name:

1. Sketch the level curves of $f(x, y) = 6 - 3x - 2y$ for the values $k = -6, 0, 6, 12$. What is the shape of this surface?

2. Sketch the level curves of the function $g(x, y) = \sqrt{9 - x^2 - y^2}$ for the values $k = 0, 1, 2, 3$. What is the shape of this surface?

3. Consider the function $f(x,y) = \dfrac{xy^2}{x^2+y^4}$. We will investigate

$$\lim_{(x,y)\to(0,0)} f(x,y)$$

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(a) First show that approaching $(0,0)$ along the x-axis and y-axis give you the same limit.

(b) Show that approaching $(0,0)$along lines of the form $y = kx$ still gives the same limit.

(c) Finally, approach the point $(0,0)$ along the parabola $x = y^2$. What is the limit along this path?

(d) Does $\lim_{(x,y)\to(0,0)} f(x,y)$ exist or not?