

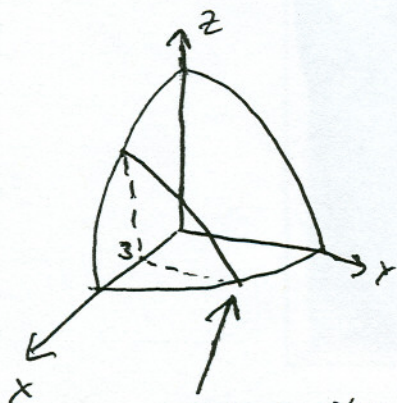
3. (a) Find $\lim_{\substack{(x,y) \rightarrow (0,0) \\ \text{along } y=3x}} \frac{x^3 y}{x^6 + 2y^2} = \lim_{x \rightarrow 0} \frac{x^3 \cdot 3x}{x^6 + 2(3x)^2} = \lim_{x \rightarrow 0} \frac{3x^4}{x^6 + 18x^2} = \lim_{x \rightarrow 0} \frac{3x^2}{x^4 + 18} = 0$

(b) Find $\lim_{\substack{(x,y) \rightarrow (0,0) \\ \text{along } y=x^3}} \frac{x^3 y}{x^6 + 2y^2} = \lim_{x \rightarrow 0} \frac{x^6}{x^6 + 2x^6} = \lim_{x \rightarrow 0} \frac{x^6}{3x^6} = \lim_{x \rightarrow 0} \frac{1}{3} = \frac{1}{3}$

4. Find the slope of the line tangent to the curve of intersection of the surface $36z = 4x^2 + 9y^2$ and the plane $x = 3$ at the point $(3, 2, 2)$.

$$z = \frac{x^2}{9} + \frac{y^2}{4}$$

We want $\left. \frac{\partial z}{\partial y} \right|_{(3,2,2)} = \left. \frac{2y}{4} \right|_{(3,2,2)} = 1$



this is the curve. z is a function of y alone.