

Quiz 5

① Draw level curves for $k = -1, 0, 1$ for surface $z = 3x + 2y$

$$\underline{k = -1}$$
$$-1 = 3x + 2y$$

⇓

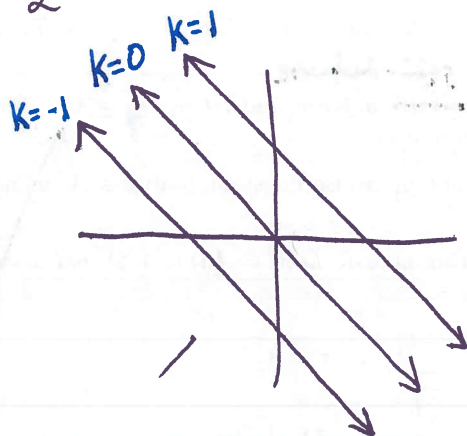
$$y = -\frac{3x}{2} - \frac{1}{2}$$

$$\underline{k = 0}$$
$$0 = 3x + 2y$$

$$y = -\frac{3}{2}x$$

$$\underline{k = 1}$$
$$1 = 3x + 2y$$

$$y = \frac{1}{2} - \frac{3x}{2}$$



② Show the limit DNE: $\lim_{(x,y) \rightarrow (0,0)} \frac{x^2 + 3y^2}{x^2 + y^2}$

Path 1: y -axis $(0, y)$

Limit becomes

$$\lim_{(0,y) \rightarrow (0,0)} \frac{0^2 + 3y^2}{0^2 + y^2} = \lim_{y \rightarrow 0} 3 = 3$$

Path 2: line $y = x$ (x, x)

Limit becomes

$$\lim_{(x,x) \rightarrow (0,0)} \frac{x^2 + 3x^2}{x^2 + x^2} = \lim_{x \rightarrow 0} \frac{3}{2} = \frac{3}{2}$$

different values
⇒ limit DNE