Quiz for lecture 6.

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Section: 8:40 - 10:00 A.M.

1. Find the limit if it exists or show that the limit doesn't exist.

$$\lim_{(x,y)\to(0,0)} \frac{2x}{2x+3y}$$

Assume $y=mx$.

$$\frac{2x}{2x+3y} = \frac{2}{2+3\frac{y}{x}} = \frac{2}{3m+2}$$

It's relate to m which is not a constant

∴ The limit doesn't exist.

2. Find the limit if it exists, or show that the limit doesn't exist.

$$\lim_{(x,y)\to(0,0)} \frac{x^5}{x^2+y^2}$$

$$\frac{x^5}{x^2+y^2} = \frac{x^2}{x^2+y^2}\cdot x^3$$

$$0 \le \frac{x^2}{x^2+y^2} \le 1.$$

$$-|x^3| \le \frac{x^5}{x^2+y^2} \le |x^3|$$

when $x\to 0$, the limit of $\frac{5}{x^2+y^2}$ is 0.

$0 \le \frac{x^5}{x^2+y^2} \le 0$,

∴ $\lim_{(x,y)\to(0,0)} \frac{x^5}{x^2+y^2} = 0.$