

"QUIZ" for Lecture 6

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E-MAIL SCANNED .pdf OF COMPLETED QUIZ to DrZcalc3@gmail.com (Attachment: q6FirstLast.pdf) ASAP BUT NO LATER THAN Sept. 24, 8:00pm

1. Find the limit if it exists, or show that the limit does not exist.

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

$$\begin{aligned} \text{Let } y &= cx \\ \lim_{(x \rightarrow 0)} \frac{2x}{2x+3cx} \\ &= \frac{2}{2+3c} \end{aligned}$$

Since the limit depends on the slope, it doesn't exist

2. Find the limit if it exists, or show that the limit does not exist.

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

$$\begin{aligned} \text{Let } y &= cx \\ \lim_{x \rightarrow 0} \frac{x^5}{x^2+c^2x^2} \\ \lim_{x \rightarrow 0} &= \frac{x^3}{1+c^2} \\ &= 0 \end{aligned}$$
$$\begin{aligned} \lim_{x \rightarrow 0} \frac{x^5 \cos^5 \theta}{x^2 \cos^2 \theta + x^2 \sin^2 \theta} \\ \lim_{x \rightarrow 0} &= \frac{x^5 \cos^5 \theta}{x^2} \\ \lim_{x \rightarrow 0} &= x^3 \cos^5 \theta = 0 \\ &\text{limit exists} \end{aligned}$$