

"QUIZ" for Lecture 6

NAME: (print!) SAI EMBAR Section: 23

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.

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

$y = cx$

$$\lim_{x \rightarrow 0} \frac{2x}{2x+3cx} = \frac{2x}{x(2+3c)} = \frac{2}{2+3c} = \boxed{\text{DNE}}$$

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

$y = cx$

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

$$\lim_{x \rightarrow 0} \frac{x^5}{x^2+(cx)^2} \rightarrow \frac{x^5}{x^2(1+c^2)} = \frac{x^3}{1+c^2}$$

$x = r \cos \theta$

$y = r \sin \theta$

$$f(r \cos \theta, r \sin \theta) = \frac{(r \cos \theta)^5}{(r \cos \theta)^2 + (r \sin \theta)^2} = \frac{r^5 \cos^5 \theta}{r^2 \cos^2 \theta + r^2 \sin^2 \theta} = \frac{r^5 \cos^5 \theta}{r^2 (\cos^2 \theta + \sin^2 \theta)}$$

$$= \frac{r^5 \cos^5 \theta}{r^2 \cdot 1} = r^3 \cos^5 \theta$$

$$\lim_{r \rightarrow 0} r^3 \cos^5 \theta = 0$$

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