"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.

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

$y = cx$

$$\lim_{x\to 0} \frac{2x}{2x+3cx} = \lim_{x\to 0} \frac{2x}{(2+3c)x} = \lim_{x\to 0} \frac{2}{2+3c}$$

The limit will be different for different points since it depends on the slope of c. So the limit does not exist.

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

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

$y = cx$

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

$x = r\cos\theta$
$y = r\sin\theta$

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

$$\lim_{r\to 0} \frac{(r\cos\theta)^5}{(r\cos\theta)^2+(r\sin\theta)^2} = \lim_{r\to 0} \frac{r^5(\cos\theta)^5}{r^2(\cos\theta^2+\sin\theta)^2} = \frac{r^3(\cos\theta)^5}{(\cos\theta^2+\sin\theta^2)} = \frac{0}{1} = 0$$