Quiz #4 Math 101 Semester 042

Name:	I.D.	Section #	

1. Find $\lim_{x\to 0}\left(\frac{1}{x}-\frac{1}{e^x-1}\right)$

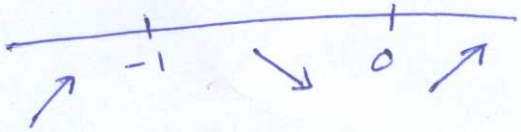
$$\lim_{x\to 0}\frac{e^x-1-x}{x(e^x-1)}\left(\frac{0}{0}\right)=\lim_{x\to 0}\frac{e^x-1}{(e^x-1)+xe^x}\left(\frac{0}{0}\right)$$

$$=\lim_{x\to 0}\frac{e^x}{e^x+e^x+xe^x}=\frac{1}{2}$$

2. Consider $f(x)=2x+3x^{\frac{2}{3}}$, find interval of increasing decreasing concavity and IP.

$$f'=2+2x^{-1/3}=2+\frac{2}{\sqrt[3]{x}}=0 \qquad \frac{2}{\sqrt[3]{x}}=-2 \qquad \boxed{x=-1}$$

C.P. at $x=-1$, $f'=0$; 0, f' DNE



increasing $(-\infty,-1)\cup(0,\infty)$

decreasing $(-1,0)$

$$f''=\frac{-2}{3}x^{-4/3}=\frac{-2}{3\sqrt[3]{x^4}}$$

Concave down $\mathbb{R}=(-\infty,\infty)$

No IP.