quiz 7
math1117.02
u new haven
wed, 25 sep

name: Solution

1 (10 points). Determine the truth of the following statements and give an explanation if true or counterexample if false. Assume that a and L are finite numbers.

(a) If $\lim_{x\to a} f(x) = L$, then $f(a) = L$.

(b) If $\lim_{x\to a^-} f(x) = L$, then $\lim_{x\to a^+} f(x) = L$.

(c) If $\lim_{x\to a} f(x) = L$ and $\lim_{x\to a} g(x) = L$, then $f(a) = g(a)$.

(a) false. $\lim_{x\to 1} \frac{x-1}{x-1} = 1$ but $\frac{x-1}{x-1}$ is undefined at $x=1$.

(b) false. $f(x) = \begin{cases} 0, & x<0 \\ 1, & x\geq 0 \end{cases}$ has $\lim_{x\to 0^-} f(x) = 0$ but $\lim_{x\to 0^+} f(x) = 1$.

(c) false. $f(x) = \begin{cases} x/x, & x\neq 0 \\ 1, & x=0 \end{cases}$ $g(x) = \begin{cases} x/x, & x\neq 0 \\ 2, & x=0 \end{cases}$

Then $\lim_{x\to 0} f(x) = 1 = \lim_{x\to 0} g(x)$ but

$f(0)=1$ & $g(0)=2$.