ASSIGNMENT

1. If for a function $f(t)$, its limit exists at $t = x$, then prove that it is unique.

2. Let $(t) = \begin{cases} -1, & t < 0 \\ 1, & t \geq 0 \end{cases}$. Show that $\lim_{t \to 0^+} f(t) = 1$ and $\lim_{t \to 0^-} f(t) = -1$.

3. Suppose $\lim_{t \to x} f(t) = l_1$ and $\lim_{t \to x} g(t) = l_2$. Then prove that $\lim_{t \to x} \{f(t) \pm g(t)\} = l_1 \pm l_2$.

4. Prove that if $p(t)$ is a polynomial function then $\lim_{t \to a} p(t) = p(a)$ for every real number a.

5. Prove that a function f is continuous at x if and only if it is continuous from right as well as left.

6. If the functions $f(t)$, $g(t)$ and $h(t)$ are differentiable at $t = c$ obtain the value of $(fgh)'(c)$ in terms of $f'(c)$, $g'(c)$ and $h'(c)$.

7. Compute the derivative of $\frac{t-1}{t^2+1}$ using the quotient rule for differentiation.