Assignment 2

Q1 Use a graph to find a number δ such that if $|x - \pi/4| < \delta$ then $|\tan x - 1| < 0.2$.

Q2 For the limit $\lim_{x \to 2} (x^3 - 3x + 4) = 6$, illustrate the precise definition of limit by finding the values of δ that correspond to $\varepsilon = 0.2$ and $\varepsilon = 0.1$.

Q3 Prove that $\lim_{x \to 3} x^2 = 9$, using precise definition.

Q4. Use continuity to evaluate $\lim_{x \to \pi} \frac{\sin x}{2 + \cos x}$

Q5 If f is continuous on $(-\infty, \infty)$, what can you say about it's graph?

Q6 Use the definition of continuity and the properties of Lim to show that the function is continuous at the given number a.

i) $f(x) = 3x^4 - 5x + 3\sqrt{x^4 + 4}$, $a = 2$

ii) $f(x) = (x + 2x^3)^4$, $a = -1$, iii) $h(t) = \frac{2t - 3t^2}{1 + t^3}$, $a = 1$.

Q7 Explain, using theorem of continuous fns, why the fns are continuous at every number in its domain. State the domain.

i) $G(x) = \frac{x^2 + 1}{2x^2 - x - 1}$ ii) $f(x) = \frac{\sqrt[3]{x - 2}}{x^3 - 2}$