Quiz 1

Sep 29 2004, 7 PM

Show all details.

1. Write down the definition of
$$\lim_{x\to 1} x^3 = 1$$
in terms of ϵ and δ. Then find a δ that works for $\epsilon = 0.01$ (need not be the best δ).
Hint: $x^2 + x + 1 = (x + \frac{1}{2})^2 + \frac{3}{4}$.

2. State the Intermediate Value Theorem. Use it to locate a root of $x - 1 = \sin x$ on an interval of length 1. That is, find a c such that there is a root on $(c, c + 1)$.

3. How would you define the following limits formally using ϵ and δ?
$$(a)\ \lim_{x\to 0^-} f(x) = 1 \qquad\qquad (b)\ \lim_{x\to\infty} f(x) = -\infty$$

4. Show that if both $f(x)$ and $g(x)$ are continuous at $x = c$, then so is $f(x) + 2g(x)$.

5. State the '$x \to c$ and '$x \to -\infty$ versions of the Sandwich Theorem (Need not use ϵ and δ).

Calculus, Fall 2003

Quiz 1

Sep 29 2004, 7 PM

Show all details.

1. Write down the definition of
$$\lim_{x\to 1} x^3 = 1$$
in terms of ϵ and δ. Then find a δ that works for $\epsilon = 0.01$ (need not be the best δ).
Hint: $x^2 + x + 1 = (x + \frac{1}{2})^2 + \frac{3}{4}$.

2. State the Intermediate Value Theorem. Use it to locate a root of $x - 1 = \sin x$ on an interval of length 1. That is, find a c such that there is a root on $(c, c + 1)$.

3. How would you define the following limits formally using ϵ and δ?
$$(a)\ \lim_{x\to 0^-} f(x) = 1 \qquad\qquad (b)\ \lim_{x\to\infty} f(x) = -\infty$$

4. Show that if both $f(x)$ and $g(x)$ are continuous at $x = c$, then so is $f(x) + 2g(x)$.

5. State the '$x \to c$ and '$x \to -\infty$ versions of the Sandwich Theorem (Need not use ϵ and δ).