

## Quiz 1

Oct 03, 2013

Show all details.

1. Find  $\lim_{\theta \rightarrow 0} \frac{\sin \theta}{\tan 2\theta}$ .
2. State the Intermediate Value Theorem (Need not prove). Use it to find a  $c$  such that there a root of " $x - 1 = \cos x$ " on  $(c, c + 1)$ .
3. Write down the definition of  $\lim_{x \rightarrow 2} \frac{1}{x} = 0.5$  in terms of  $\epsilon$  and  $\delta$ . Then find one  $\delta$  that works for  $\epsilon = 0.1$  (need not be the best  $\delta$ ). Explain.
4. Give precise definitions of the following limits (Just the definition, need not find  $\delta$ ).
  - (a)  $\lim_{x \rightarrow c^-} f(x) = L$
  - (b)  $\lim_{x \rightarrow -\infty} f(x) = \infty$
5. Use the  $\epsilon - \delta$  argument to show that if both  $f(x)$  and  $g(x)$  are continuous at  $x = c$ , then so is  $2f(x) + 3g(x)$ .

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