

PRINT Your Name: _____

Quiz 8 — March 7, 2014 – Section 8 – 10:50 – 11:40

Remove everything from your desk except this page and a pencil or pen.

The solution will be posted soon after the quiz is given.

Circle your answer. **Show your work. Your work must be correct and coherent.**

The quiz is worth 5 points.

Consider the sequence whose n^{th} is $a_n = \ln(2n^2 + 1) - \ln(n^2 + 1)$. Does this sequence converge? If so, find its limit.

Answer: Use the rules of logarithm and divide the top and the bottom by n^2 to see that

$$\begin{aligned}\lim_{n \rightarrow \infty} a_n &= \lim_{n \rightarrow \infty} (\ln(2n^2 + 1) - \ln(n^2 + 1)) = \lim_{n \rightarrow \infty} \ln \left(\frac{2n^2 + 1}{n^2 + 1} \right) = \lim_{n \rightarrow \infty} \ln \left(\frac{2 + \frac{1}{n^2}}{1 + \frac{1}{n^2}} \right) \\ &= \ln 2.\end{aligned}$$

We conclude that the sequence converges to $\ln 2$.