
Please submit a solution to your instructor by Friday, November 6, 2009 before 5 pm.

1. (1/(N+1) points) Consider the sequence $\{x_i\}$ defined by $x_1 = 1$ and for $n > 1$

$$x_{n+1} = \frac{1}{\sqrt{2}} \sqrt{1 - \sqrt{1 - x_n^2}}.$$

Does the limit

$$\lim_{n \rightarrow \infty} x_n$$

exist? If it does, find its value.