

Quiz 4

Apr. 11, 2007

1. (5pts) Determine if the sequence converges or diverges. If it converges, find the limit.

$$a_n = \frac{2n^2 + n}{n^2 - 3}$$

2. (7pts) Determine if the series converges or diverges.

$$\sum_{n=1}^{\infty} \left(\frac{1}{3^k} + k \right)$$

3. (8pts) Determine convergence or divergence of the series.

$$\sum_{k=1}^{\infty} \frac{k + 2}{k^3 + k^2 + 3}$$

4. (0pt) Achilles and the tortoise-“You can never catch up.”

“In a race, the quickest runner can never overtake the slowest, since the pursuer must first reach the point whence the pursued started, so that the slower must always hold a lead.”
(Aristotle *Physics VI:9, 239b15*)

Being very fast, Greek hero Achilles gives the Tortoise a head start. But that would be a big mistake, claims Zeno, for then Achilles could never catch up. Why not? The proof is that by the time Achilles reaches the Tortoise's starting point S_1 , the Tortoise will have moved a little to S_2 , but then by the time Achilles reaches S_2 the Tortoise will have moved on to S_3 , but then by the time ...