



CALCULUS II
SPRING 2011

ASSIGNMENT 9.2
DUE OCTOBER 21

Exercises 1 - 4: Determine whether the sequence converges or diverges. If it converges, find the limit.

Exercise 1. $a_n = \frac{3^{n+2}}{5^n}$

Exercise 2. $\left\{ \frac{e^n + e^{-n}}{e^{2n} - 1} \right\}$

Exercise 3. $\{n^2 e^{-n}\}$

Exercise 4. $a_n = \left(1 + \frac{2}{n}\right)^n$

Exercise 5. A sequence $\{a_n\}$ is defined by $a_1 = 1$ and $a_{n+1} = 1/(1 + a_n)$ for $n \geq 1$. Assuming that $\{a_n\}$ is convergent, find its limit.

Exercise 6. Assuming that it exists, find the limit of the sequence

$$\left\{ \sqrt{2}, \sqrt{2\sqrt{2}}, \sqrt{2\sqrt{2\sqrt{2}}}, \dots \right\}.$$

Exercise 7. Recall that the Fibonacci sequence $\{F_n\}$ is defined by $F_1 = F_2 = 1$ and $F_{n+1} = F_n + F_{n-1}$ for $n \geq 2$.

a. Let $a_n = F_n/F_{n-1}$. Show that $a_n = 1 + 1/a_{n-1}$.

b. Assuming that it exists, find $\lim_{n \rightarrow \infty} a_n$.