

## HOMEWORK 11

- 1) Prove  $\{\frac{1}{3^{n-1}}\}$  converges to zero.
- 2) Prove  $\{4 + \frac{1}{3^n}\}$  converges to 4.
- 3) Prove  $\{\frac{2n+1}{5n+3}\}$  converges to  $\frac{2}{5}$ .
- 4) Prove  $\{\sqrt{n}\}$  diverges to infinity.
- 5) Prove  $\{n^3\}$  diverges to infinity.
- 6) Prove  $\{(-2)^n\}$  diverges.
- 7) Prove  $\{1 + (-1)^n\}$  diverges.
- 8) Let  $\{a_n\}$ ,  $\{b_n\}$ , and  $\{c_n\}$  be sequences of real numbers such that  $a_n \leq b_n \leq c_n$  for all natural numbers  $n$ . Also assume that  $\{a_n\}$  and  $\{c_n\}$  converge to a limit  $L$ .
  - a) Prove that  $\{a_n - c_n\}$  converges to zero.
  - b) Prove that  $\{b_n\}$  converges to  $L$ .