

Name: \_\_\_\_\_

Score: \_\_\_\_\_

1. Determine whether each of the following statements is true or false, and explain your answers briefly. (2 points each)
  - (a) The sequence  $a_n = \cos(\frac{\pi}{n})$  converges.
  - (b) The series  $\sum_{n=1}^{\infty} \frac{1}{2n+1}$  converges.
  - (c) The series  $\sum_{n=1}^{\infty} \frac{n}{n^3+2}$  converges.
  - (d) The series  $\sum_{n=1}^{\infty} \frac{1}{2^n+n}$  converges and equals to 1.
  - (e) If the series  $\sum_{n=1}^{\infty} a_n$  converges, then the series  $\sum_{n=1}^{\infty} (a_n + 1)$  converges also.
  - (f) \* Given a sequence  $a_n$ , let  $s_n = \frac{a_1+\dots+a_n}{n}$  be the average of the first  $n$  terms. If  $s_n$  converges then  $a_n$  converges.