

**MAT 319: HOMEWORK 7**  
DUE TH, OCT 27

1. Prove that if for all  $n$ ,  $a_n > 0$ ,  $b_n > 0$  and  $\lim(a_n/b_n) = C$  exists and is non-zero (and finite), then  $\sum a_n$  converges if and only if  $\sum b_n$  converges. (We did a special case of this in class).
2. Which of the following series converge ?
  - (a)  $\sum \frac{x^n}{\sqrt{n!}}$  (answer may depend on  $x$ )
  - (b)  $\sum \frac{2^n + (-1)^n}{3^n + 1}$
  - (c)  $\sum \frac{2^n}{n^2}$
  - (d)  $\sum \frac{\ln(n)}{n^2}$
  - (e)  $\sum \frac{n^3 + 2n + \sin(n\pi/6)}{n^5 + 3n + 1}$
  - (f)  $\sum \frac{(-1)^n n^2 + 3n - 7}{n^3 + 1}$
3. Textbook, 15.4
4. Textbook, 15.6