- 1. For each of the following series
  - write C if it converges, D if it diverges and CT if we can't tell
  - if the series is geometric or is a p-series, write that and give the value of r or p
  - if the series diverges because of the nth term test, write "nth term test" (without the quotes)
  - if it is a convergent geometric series, find what it converges to

(a) 
$$\sum_{n=0}^{\infty} \frac{3(2)^n}{5^n}$$

(b) 
$$\sum_{n=1}^{\infty} \frac{n^2}{5^n}$$

(c) 
$$\sum_{n=1}^{\infty} \frac{n!}{(n+1)!}$$

(d) 
$$\sum_{n=1}^{\infty} \left(\frac{5}{3}\right)^{n-1}$$

(e) 
$$\sum_{n=1}^{\infty} \frac{1}{\sqrt{n}}$$

(f) 
$$\sum_{n=1}^{\infty} \frac{n^2}{2^n}$$

(g) 
$$\sum_{n=1}^{\infty} \frac{(n+1)!}{n!}$$

(h) 
$$\sum_{n=0}^{\infty} \frac{n!}{5^n}$$

(i) 
$$\sum_{n=0}^{\infty} \left(-\frac{3}{4}\right)^n$$

(j) 
$$\sum_{n=1}^{\infty} \frac{3}{n^5}$$

(k) 
$$\sum_{n=1}^{\infty} \frac{3(2)^n}{5^{n-1}}$$

(I) 
$$\sum_{n=1}^{\infty} \frac{2^n}{n^2}$$

2. Use the methods of Example 242 to determine the value of each of the following series. **Show** your work neatly on additional paper.

(a) 
$$\sum_{n=1}^{\infty} \frac{1}{n!}$$
 (b)  $\sum_{n=1}^{\infty} \frac{(-1)^{n+1}(n+(-1)^n)}{n^2}$ 

- 3. For each of the following series, use the method of Example 240 to
  - ullet write out the first four terms of the series, followed by  $\cdots$
  - give the first four partial sums of the series
  - give the nth partial sum of the series
  - determine whether the series converges, or whether it diverges, and give what it converges to if it does converge

## Do all of this on extra paper.

(a) 
$$\sum_{n=1}^{\infty} \left( \frac{1}{\sqrt{n}} - \frac{1}{\sqrt{n+1}} \right)$$
 (b)  $\sum_{n=1}^{\infty} \left( \ln n - \ln(n+1) \right)$