NOTE: The symbol **!!!** indicates that this series is one of the top three series to understand. These series will be used repeatedly in this and other classes.

1. **(!!!)** A geometric series has form

2. **Ex 1:** $\displaystyle\sum_{n=1}^{\infty} \left(\frac{2}{3}\right)^{n-1}$

3. **Ex 2:** $\displaystyle\sum_{n=1}^{\infty} \frac{4^{n-1}}{3^n}$

4. A telescoping series is

5. **Ex 3:** $\displaystyle\sum_{n=1}^{\infty} \frac{1}{n(n+1)}$

§5.2

6. **(!!!)**
$$\sum_{n=1}^{\infty} \frac{1}{n}$$

7. For each series below, determine whether the series converges or diverges. If it converges, determine its sum. State the technique you are using.

(a) $\displaystyle\sum_{n=1}^{\infty} \left(\frac{2}{3}\right)^n$

(b) $\displaystyle\sum_{n=1}^{\infty} 10\left(\frac{-3}{5}\right)^n$

(c) $\displaystyle\sum_{n=1}^{\infty} (e^{2/n} - e^{2/(n+1)})$

(d) $\displaystyle\sum_{n=1}^{\infty} \left[\left(\frac{2}{3}\right)^n + 10\left(\frac{-3}{5}\right)^n\right]$

(e) $\displaystyle\sum_{n=1}^{\infty} \frac{\sin(\pi n/2)}{5}$