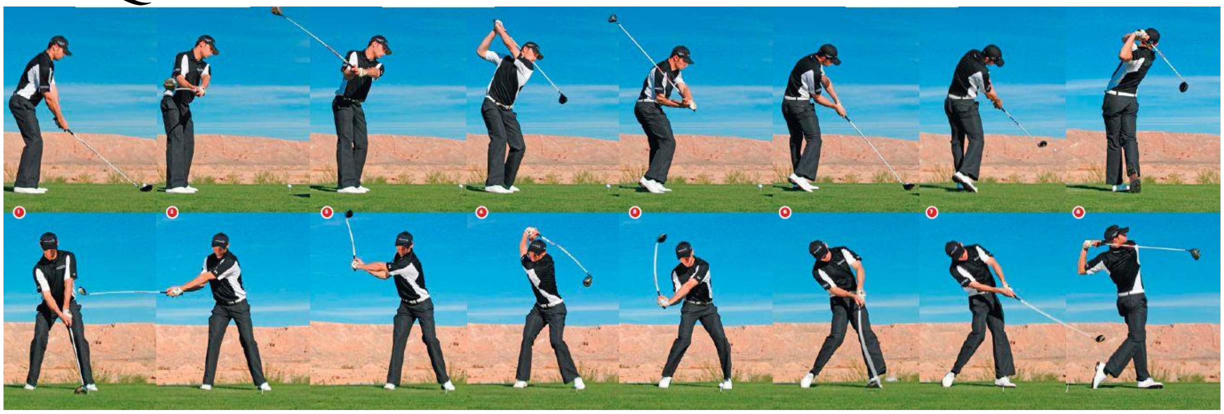
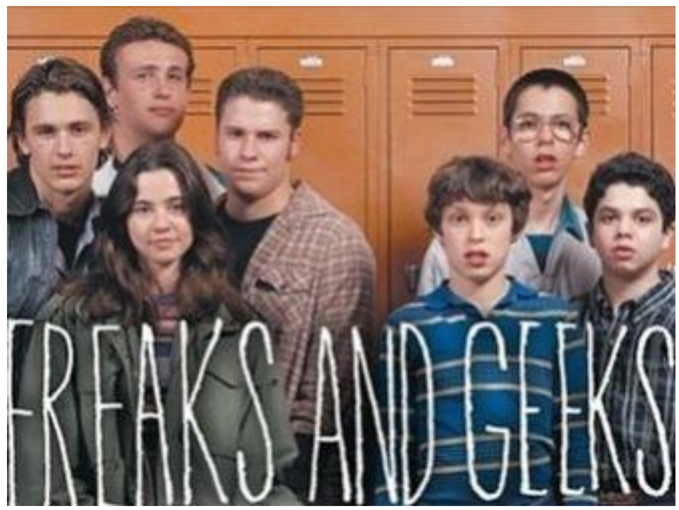
# Chapter 9
# Sequences & Series






$$\frac{1}{1-u} = \sum_{n=0}^{\infty} u^n = 1 + u + u^2 + \cdots + u^n + \cdots \qquad -1 < u < 1$$

$$e^u = \sum_{n=0}^{\infty} \frac{u^n}{n!} = 1 + u + \frac{u^2}{2!} + \cdots + \frac{u^n}{n!} + \cdots \qquad -\infty < u < +\infty$$

$$\cos u = \sum_{n=0}^{\infty} (-1)^n \frac{u^{2n}}{(2n)!} = 1 - \frac{u^2}{2!} + \frac{u^4}{4!} - \cdots + (-1)^n \frac{u^{2n}}{(2n)!} + \cdots \qquad -\infty < u < +\infty$$

$$\sin u = \sum_{n=0}^{\infty} (-1)^n \frac{u^{2n+1}}{(2n+1)!} = u - \frac{u^3}{3!} + \frac{u^5}{5!} - \cdots + (-1)^n \frac{u^{2n+1}}{(2n+1)!} + \cdots \qquad -\infty < u < +\infty$$

$$\ln(1+u) = \sum_{n=1}^{\infty} (-1)^{n+1} \frac{u^n}{n} = u - \frac{u^2}{2} + \frac{u^3}{3} - \cdots + (-1)^{n+1} \frac{u^n}{n} + \cdots \qquad -1 < u \leq 1$$

$$(1+u)^a = 1 + \sum_{n=1}^{\infty} \frac{a(a-1)\cdots(a-n+1)}{n!} u^n \qquad -1 < u < 1$$