

Exempel: Beräkna  $\sum_{k=2}^{\infty} \frac{2}{3^k}$ .

Lösning:  $\sum_{k=0}^{\infty} q^k = \frac{1}{1-q}$ ,  $|q| < 1$  ( $(1-q)(1+q+q^2+\dots+q^n) = 1-q^{n+1}$   
partialsomme  
 $\frac{1-q^{n+1}}{1-q} \rightarrow \frac{1}{1-q}$  då  $n \rightarrow \infty$   
och  $|q| < 1$ )

$$\begin{aligned} \sum_{k=2}^{\infty} \frac{2}{3^k} &= \frac{2}{3^2} + \frac{2}{3^3} + \frac{2}{3^4} + \dots = \frac{2}{3^2} \left( \left(\frac{1}{3}\right)^0 + \left(\frac{1}{3}\right)^1 + \left(\frac{1}{3}\right)^2 + \dots \right) \\ &= \frac{2}{9} \cdot \sum_{k=0}^{\infty} \left(\frac{1}{3}\right)^k = \frac{2}{9} \cdot \frac{1}{1-1/3} = \frac{2}{9} \cdot \frac{3}{2} = \underline{\underline{\frac{1}{3}}} \end{aligned}$$