

# Summing the Geometric Series

Session 94

$$a) S_0 = \sum_{n=0}^0 \frac{1}{2^n} = \frac{1}{2^0} = 1$$

$$b) \sum_{n=0}^{N-1} \frac{1}{2^n} + \frac{1}{2^N} = \frac{2^N - 1}{2^{N-1}} + \frac{1}{2^N}$$

$$S_N = \frac{2^{N+1} - 1}{2^N}$$

$$c) \lim_{N \rightarrow \infty} S_N = \lim_{N \rightarrow \infty} \frac{2^{N+1} - 1}{2^N} = \lim_{N \rightarrow \infty} \left( \frac{2^{N+1}}{2^N} - \frac{1}{2^N} \right) = 2$$