

Name: Solutions

Section: 7 8

1. Find the limit of the following sequences.

(a) $\left\{ \left(1 - \frac{2}{n}\right)^n \right\}$

$$\left(1 - \frac{2}{n}\right)^n = \left(1 + \frac{-2}{n}\right)^n \rightarrow e^{-2}$$

common limit

(b) $\{\sqrt[n]{n}\}$

$$\sqrt[n]{n} \rightarrow 1 \quad \text{common limit}$$

(c) $\left\{ \frac{n-17}{2n-13} \right\}$

$$\frac{n-17}{2n-13} = \frac{1 - 17/n}{2 - 13/n} \rightarrow \frac{1-0}{2-0} = \frac{1}{2}$$

(d) $\left\{ \frac{(-1)^n}{n^2} \right\}$ alternating try squeeze

$$-\frac{1}{n^2} \leq \frac{(-1)^n}{n^2} \leq \frac{1}{n^2}$$

Since $\lim_{n \rightarrow \infty} \left(-\frac{1}{n^2}\right) = 0 = \lim_{n \rightarrow \infty} \left(\frac{1}{n^2}\right)$, then

$$\lim_{n \rightarrow \infty} \frac{(-1)^n}{n^2} = 0.$$