

**mono a mono**

1. Use the recommended method to show that the given sequence is eventually strictly increasing or eventually strictly decreasing. Determine whether or not the sequence converges. If the sequence converges, find the limit.

(a) difference

$$\left\{ 3 - \frac{1}{n} \right\}_{n=1}^{+\infty}$$

(b) ratio

$$\left\{ \frac{n!}{e^{2n}} \right\}_{n=1}^{+\infty}$$

(c) differentiation

$$\left\{ \tan^{-1} n \right\}_{n=1}^{+\infty}$$

2. Suppose that  $\{a_n\}$  is a monotone sequence such that  $-1 \leq a_n \leq 1$ . Must the sequence converge? If so, what can you say about the limit?

3. Suppose that  $\{b_n\}$  is a monotone sequence such that  $b_n \leq 5$ . Must the sequence converge? If so, what can you say about the limit?