

Calculus 1 Solved problems—Sequences

Evaluate the following limits:

$$1. \lim_{n \rightarrow \infty} \left[\left(\frac{1 - 4n^2 + 3n}{3 + n + 2n^2} \right)^3 + \frac{1 + e^{-n}}{n^2 + \frac{1}{n}} \right].$$

$$2. \lim_{n \rightarrow \infty} \left(\cos \left(\frac{2^{2n+1} + (-2)^n}{5^n + 2^{2n-1}} \right) \right).$$

$$3. \lim_{n \rightarrow \infty} (\sqrt{n^2 + 4n} - \sqrt{n^2 + 1}).$$

$$4. \lim_{n \rightarrow \infty} \left(\frac{n-1}{n+1} \right)^{2n-1}.$$

$$5. \text{ a) } \lim_{n \rightarrow \infty} (n + (-1)^n).$$

$$\text{ b) } \lim_{n \rightarrow \infty} (n \cdot (-1)^n).$$

$$\text{ c) } \lim_{n \rightarrow \infty} \left(\sin \left(\frac{\pi}{2} n \right) \right).$$

$$\text{ d) } \lim_{n \rightarrow \infty} \left(\frac{1}{n} \sin \left(\frac{\pi}{2} n \right) \right).$$