

1. Prove that $\left\langle \frac{1}{n^3 + 12345} \right\rangle$ converges to 0.
2. Show that $\left\langle \frac{n^2 + 5}{4n^2} \right\rangle$ where $n > 0$ converges to $\frac{1}{4}$.
3. Consider the sequence $\langle (-1)^n n^2 \rangle$. This sequence obviously diverges.
 - (a) Prove that this sequence diverges by showing it is unbounded.
 - (b) Prove that this sequence diverges by showing it does not converge to any real number L .
4. Suppose that $\langle a_n \rangle$ converges to L . Show that $\langle |a_n| \rangle$ converges to $|L|$.
5. Suppose that $\langle a_n \rangle$ and $\langle b_n \rangle$ converge to 0. Show that $\langle a_n b_n \rangle$ converges to 0 as well.