Section 8.4: Comparison of Series

A. Convergence and Divergence Tests (Cont.)

6. **Theorem 8.12 - Direct Comparison Test:** Let $0 < a_n \le b_n$ for all n.

   - If $\displaystyle\sum_{n=1}^{\infty} b_n$ converges, then $\displaystyle\sum_{n=1}^{\infty} a_n$ converges

   - If $\displaystyle\sum_{n=1}^{\infty} a_n$ diverges, then $\displaystyle\sum_{n=1}^{\infty} b_n$ diverges

   Examples: 4, 6, 8

7. **Theorem 8.13 - Limit Comparison Test:** Suppose $a_n > 0$, $b_n > 0$, and

$$\lim_{n \to \infty} \left(\frac{a_n}{b_n} \right) = L$$

   where L is finite and positive. The two series $\displaystyle\sum_{n=1}^{\infty} a_n$ and $\displaystyle\sum_{n=1}^{\infty} b_n$ either both converge or both diverge.

   Examples: 16, 18, 28, (34)