

Practice Tests

Use the Comparison Test, if possible, to determine whether the following series converge or diverge. If you cannot use the Comparison Test, use the Limit Comparison Test. If neither test works, explain why.

1. Round 1: Warm up with these comparisons.

(a) $\sum_{k=1}^{\infty} \frac{1}{k^2 + 1}$

(b) $\sum_{k=2}^{\infty} \frac{1}{k^2 - 1}$

(c) $\sum_{k=1}^{\infty} \frac{2^k - 1}{3^k + 1}$

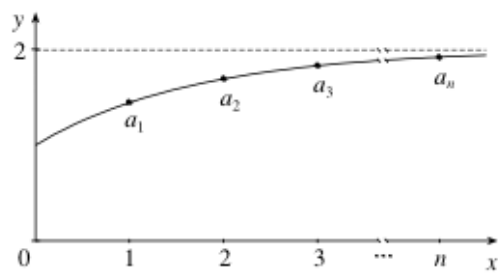
(d) $\sum_{k=1}^{\infty} \frac{2^k + 1}{3^k - 1}$

2. Round 2: These are trickier sums!

(a) $\sum_{k=1}^{\infty} \frac{e^k}{k^k}$

(b) $\sum_{k=1}^{\infty} \sin\left(\frac{1}{k}\right)$

(c) $\sum_{k=1}^{\infty} 2^{-k} a_k$, where $a_k = f(k)$ is pictured below.



(d) $\sum_{k=1}^{\infty} \frac{1 + \cos(k\pi)}{2^k}$

(e) $\sum_{k=1}^{\infty} \frac{1}{\sqrt{k^3 + 4k + 1}}$