

$\frac{n}{3n^3+1} < \frac{n}{3n^3} = \frac{1}{3n^2} < \frac{1}{n^2}$ for all $n \geq 1$, so $\sum_{n=1}^{\infty} \frac{n}{3n^3+1}$ converges by comparison with $\sum_{n=1}^{\infty} \frac{1}{n^2}$, which converges because it is a p -series with $p = 2 > 1$.