

$$a_n = \frac{n^3}{3n+2} = \frac{n^3/n}{(3n+2)/n} = \frac{n^2}{3+2/n}, \text{ so } a_n \rightarrow \infty \text{ as } n \rightarrow \infty \text{ since}$$

$\lim_{n \rightarrow \infty} n^2 = \infty$ and $\lim_{n \rightarrow \infty} (3+2/n) = 3$. Diverges