Use either the Integral Test or the Standard Comparison Test or the Limit Comparison Test to explain why the series
\[ \sum_{n=1}^{\infty} \frac{2}{2n^2 + 1} \]
converges.

**Solution:** Note that for all integers \( n \geq 1 \) we have
\[ \frac{2}{2n^2 + 1} < \frac{2}{2n^2} = \frac{2}{2n^2} = \frac{1}{n^2}. \]
Since
\[ 0 < \frac{2}{2n^2 + 1} < \frac{1}{n^2} \]
for all \( n \geq 1 \) and since the series
\[ \sum_{n=1}^{\infty} \frac{1}{n^2} \]
converges (because it is a \( p \) series with \( p = 2 \), then the series
\[ \sum_{n=1}^{\infty} \frac{2}{2n^2 + 1} \]
also converges by the Standard Comparison Test.