

Math 2315 - Calculus 2

Quiz #15 - 2017.03.22

Solutions

Determine whether the following series converges or diverges:

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

We can use the comparison test after recognizing that $0 \leq \cos(1/k) \leq 1$ for $1 \leq k < \infty$. Thus

$$0 < \frac{\cos(1/k)}{\sqrt{k^3+1}} < \frac{1}{\sqrt{k^3+1}} < \frac{1}{\sqrt{k^3}}$$

Since we know

$$\sum_{k=1}^{\infty} \frac{1}{k^{3/2}}$$

converges (p - series test with $p = 3/2 > 1$), by the comparison test, the series converges.