

Math 2315 - Calculus II

Quiz #12 - 2007.11.08

Solutions

Determine whether the the following series are convergent or divergent.

1.

$$\sum_{n=1}^{\infty} e^{-n}$$

We use the integral test with $f(x) = e^{-x}$:

$$\int_1^{\infty} e^{-x} = -e^{-x} \Big|_1^{\infty} = e^{-x} \Big|_{\infty}^1 = e^{-1} - \lim_{x \rightarrow \infty} e^{-x} = e^{-1}.$$

Since the integral is finite, the sum converges.

2.

$$\sum_{k=1}^{\infty} \frac{1}{2k+5}$$

There are many ways to prove this one as well. We can use the integral test with $f(x) = \frac{1}{2x+5}$ or use the limit comparison test with $b_k = k$ and so on and so forth. No matter how it is done, we find that the sum is divergent.