

Math 122 - #21
Integral Test

In the following problems, use the Integral test to determine if the series converges or diverges. Be sure to check that the function $f(x)$ is decreasing.

1. $\sum_{n=1}^{\infty} \frac{1}{2n+1}$

6. $\sum_{n=2}^{\infty} \frac{1}{n(\ln n)^3}$

2. $\sum_{n=1}^{\infty} \frac{1}{n^2+4}$

7. $\sum_{n=1}^{\infty} \frac{1}{n^2} \cos\left(\frac{1}{n}\right)$

3. $\sum_{n=2}^{\infty} \frac{(\ln n)^2}{n}$

8. $\sum_{n=2}^{\infty} \frac{1}{n\sqrt{n^2-1}}$ (Hard)

4. $\sum_{n=1}^{\infty} \frac{n}{e^{n^2}}$

9. $\sum_{n=1}^{\infty} \frac{\ln n}{n^2}$ (Harder)

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

10. $\sum_{n=1}^{\infty} \frac{1+\ln n}{n^n}$ (Hardest)

Answers

1. Diverges

6. Converges

2. Converges

7. Converges

3. Diverges

8. Converges

4. Converges

9. Converges

5. Diverges

10. Converges