

1. (4 pts.) Does the following improper integral converge or diverge?
Give enough information to justify your answer

$$\int_8^{\infty} \frac{1}{(x+1)^{3/2}} dx$$

2. (6 pts.) Which of the following converge?

1. $\left\{ \left(1 - \frac{1}{n} \right)^n \right\}$

2. $\left\{ \frac{n + (-1)^n}{n} \right\}$

3. $\left\{ \frac{\sin n}{2^n} \right\}$

3a. (2 pts.) Is $\frac{1}{2}, \frac{1}{4}, \frac{1}{8}, \frac{1}{16}, \dots$ a sequence or a series?

3b. (2pts.) Is $\frac{1}{2} + \frac{1}{4} + \frac{1}{8} + \frac{1}{16} + \dots$ a sequence or a series?

4. (6 pts.) Which of the following converge?

1. $\sum_{n=1}^{\infty} 45 \cdot \left(\frac{1}{3}\right)^n$

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

3.

$\sum_{n=1}^{\infty} \frac{n}{\ln n}$