

1. For the following sequence, find an explicit formula for a_n , determine if the sequence converges, and if the sequence does converge, find $\lim_{n \rightarrow \infty} a_n$.

$$\frac{2}{5 \cdot 3 - \frac{1}{2}}, \frac{3}{5 \cdot 4 - \frac{1}{3}}, \frac{4}{5 \cdot 5 - \frac{1}{4}}, \frac{5}{5 \cdot 6 - \frac{1}{5}}, \dots$$

2. Use the integral test to determine if the following series converges or diverges. Show your work.

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

3. Determine whether the series converges or diverges. If it converges, find its sum. Briefly explain your answer.

(a)
$$\sum_{n=1}^{\infty} \frac{2^{n+1}}{7^{n-1}}$$

(b)
$$\sum_{k=0}^{\infty} 64 \left(\frac{9}{8} \right)^k$$