

I. Use the indicated series to respond to parts a-d.

1. $\sum_{n=1}^{\infty} \frac{6}{n!}$

- Write the first 5 terms of the series
- Calculate the first 5 terms of the sequence of partial sums
- Are the terms of the series increasing or decreasing?
- Are the partial sums of the series increasing or decreasing?

II. Respond to the following for each of the series listed.

a. Does the series converge or diverge? Justify your answer.

b. If the series converges, determine the sum if possible.

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

3. $\sum_{n=1}^{\infty} \frac{3^{n-1} + 1}{3^n}$

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

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

6. $\sum_{n=1}^{\infty} e^{-2n}$

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

8. $\sum_{n=1}^{\infty} \frac{2}{3n+5}$

9. $1 - \frac{5}{4} + \frac{25}{16} - \frac{125}{64} + \frac{625}{256} \dots$

10. $\sum_{n=2}^{\infty} \frac{\ln n}{n}$

11. $\frac{1}{4} + \frac{2}{7} + \frac{3}{12} + \dots + \frac{n}{n^2+3} + \dots$

III.12. Describe the difference between $\lim_{n \rightarrow \infty} a_n = 5$ and $\sum_{n=1}^{\infty} a_n = 5$