Ratio Test and Root Test

1. Determine if the series is convergent or divergent

$$\sum_{n=1} \frac{n!}{7^n}$$

2. Determine if the series is convergent or divergent

$$\sum_{n=1} \frac{n^3}{5^n}$$

3. Determine if the series is absolute convergent, condtional convergent, or divergent.

$$\sum_{n=1} \frac{(-1)^n e^{1/n}}{n^9}$$

4. Determine if the series is absolute convergent, condtional convergent, or divergent.

$$\sum_{n=1} \frac{(-13)^n}{n!}$$

5. Determine if the series is absolute convergent, condtional convergent, or divergent.

$$\sum_{n=1} \frac{(-1)^{n+1} 3^n}{n^5}$$

6. Determine if the series is absolute convergent, condtional convergent, or divergent.

$$\sum_{n=2} \frac{(-1)^n}{ln(3n)}$$

7. Determine if the series is absolute convergent, condtional convergent, or divergent.

$$\sum_{n=1} \frac{(-1)^n}{\sqrt[6]{n}}$$

8. Determine if the series is absolute convergent, condtional convergent, or divergent.

$$\sum_{n=1} \frac{sin(5n)}{9^n}$$

9. Determine if the series is absolute convergent, condtional convergent, or divergent.

$$\sum_{n=1} \left(\frac{n^3+7}{4n^3+6} \right)^n$$

10. Determine if the series is absolute convergent, condtional convergent, or divergent.

$$\sum_{n=1} \left(\frac{-4n}{n+6} \right)^{5n}$$

11. Detemine if the Ratio Test is Convegent, Divergent, or Inconclusive for the following series.

(a) $\sum_{n=1} \frac{4}{n^6}$

(b) $\sum_{n=1} \frac{n}{5^n}$

(c) $\sum_{n=1} \frac{(-3)^{n+1}}{\sqrt{n}}$

(d) $\sum_{n=1} \frac{4\sqrt{n}}{2+n^3}$