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Instructions: Upload a pdf of your submission to **Gradescope**. This worksheet is worth 20 points: up to 8 points will be awarded for accuracy of certain parts (to be determined after the due date) and up to 12 points will be awarded for completion of parts not graded by accuracy.

(1) Apply the **Root Test** or the **Ratio Test** on the following series and state the result.

Note that there may be other methods to determine the convergence of the following series. However, this problem tests your knowledge and understanding of the Root Test and the Ratio Test.

(a) $\sum_{n=1}^{\infty} \frac{1}{n!}$

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

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

(b) $\sum_{n=1}^{\infty} (-1)^n \frac{n^3}{3^n}$

(e) $\sum_{n=2}^{\infty} \frac{10^n}{(n+1)4^{2n+1}}$

(h) $\sum_{n=1}^{\infty} \frac{\sqrt{n}}{1+n^2}$

(c) $\sum_{n=1}^{\infty} \left(\frac{2n+3}{3n+2} \right)^n$

(f) $\sum_{n=1}^{\infty} \frac{n^n}{n!}$

(i) $\sum_{n=1}^{\infty} n e^{-n}$