## Determining Types of Convergence Tests:

1) Always **Start with n$^{th}$ term test** unless the series is instantly recognizable (geometric series or p-series)

2) Does it look like a Geometric Series? $\sum_{n=0}^{\infty}\left(\frac{2}{7}\right)^n$ Or $\sum_{n=1}^{\infty}\frac{7^{n-2}}{8^{n+1}}$
(Know how to find Sum of Geometric Series!)

3) Does it look like a P-Series Test? $\sum_{n=1}^{\infty}\frac{4}{n^3}$

4) Does it look like Integral Test? $\sum_{n=2}^{\infty}\frac{1}{n(\ln n)^4}$
(does it look like a u-substitution problem?)

(Remember conditions for Integral Test: positive, decreasing, continuous)

5)Does it look a good fit for Limit Comparison Test? $\sum_{n=1}^{\infty}\frac{5n^2-6n+3}{n^3-7n+8}$

6) Does it look like an Alternating Series? $\sum_{n=1}^{\infty}\frac{(-1)^n}{\ln n}$

7) Does it look like a good fit for Ratio Test? $\sum_{n=1}^{\infty}\frac{n!}{10^n}$ or $\sum_{n=1}^{\infty}\frac{3^{n-1}}{n2^n}$
(factorials and/or exponentials involved)

8) Does it look like a Root Test problem? $\sum_{n=1}^{\infty}\left(\frac{n+1}{2n+1}\right)^n$
(entire expression is raised to the n$^{th}$ power)

9) Direct Comparison can be an option when LCT doesn't quite seem to be a good fit $\sum_{n=1}^{\infty}\frac{1}{n+n\cos^2(n)}$

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$\sum\frac{5n^3-6n}{4n^2+8n}$ ↑ n$^{th}$ term test

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DCT

Diverges by DCT

Compare with $\frac{1}{2n}$

$\frac{1}{2n} \le \frac{1}{n+n\cos^2 n}$