TASK 1. Consider the series $\sum_{k=1}^{\infty}\left(\frac{2k+3}{3k+2}\right)^{k}$. Before seeing a step-by-step explanation, spend a couple minutes estimating/ guessing whether this series is convergent or divergent.

The Root Test

TASK 2. Go to pg 741. Fill in the blanks by copying the the Root Test boxed statement in the middle of pg 741.

Theorem The Root Test

Suppose $\sum_{n=1}^{\infty} a_n$ is an infinite series with positive terms. Consider $r = \lim_{n\to\infty}\sqrt[n]{a_n}$.

- If $0 \le r < 1$, ____.
- If $r > 1$, ____.
- $r = 1$, ____.

TASK 3a. Go to page 741. Below, either copy word-for-word or rewrite in your own words the paragraph between the Root Test boxed statement and Example 6.

TASK 3b. Summarize the main point of the paragraph:

- The **Root Test** is inconclusive ____________________ the **Ratio Test** is inconclusive.

TASK 4. Stay in page 741. Copy the solution of Example 6, which is the solution to the following. Replace 'absolutely convergent' with 'convergent'.

Example: Use the **Root Test** to determine whether the series $\sum_{k=1}^{\infty}\left(\frac{2k+3}{3k+2}\right)^k$ converge.

TASK 5a. (Will be discussed in class)

1. Use logic to estimate/guess whether the series $\sum_{k=2}^{\infty}\frac{3^k \ln k}{2^k k^5}$ converges or diverges.

TASK 5b. (Optional - taken from the practice Exam 1)

2. Use the **Root Test**, **(Limit) Comparison Test**, and **Divergence Test** (attempt all three) to determine whether the series $\sum_{k=2}^{\infty} \frac{3^k \ln k}{2^k k^5}$ converge. Some of the tests will take a lot of computation space, so don't give up too quickly.

3. Check with Wolfram|Alpha after you work for at least 15 minutes. Below, write down what Wolfram|Alpha gives you.

4. Of all three suggested tests above, please pick and state your favorite.