Write neatly and show your work. If you run out of space and need to write on the back of this sheet, please indicate that you have done so on this page.

1. (10 points)

   1. Find
   
   \[
   \lim_{n \to \infty} \frac{n^2 + n + 1}{3n^2 - n - 2}
   \]

   2. Find an example of a sequence \( a_n \) which is bounded but not convergent.

2. (10 points) Find a bound on \( R_n^0 (\sin(x) + \cos(x)) \) and use this to show that \( T_n^0 (\sin(x) + \cos(x)) \) converges to \( \sin(x) + \cos(x) \) as \( n \to \infty \).