THE CHINESE UNIVERSITY OF HONG KONG
Department of Mathematics

MATH 2050B Mathematical Analysis I

Tutorial 3 (September 26)

The following were discussed in the tutorial this week:

1. Nested Intervals Property.
   - The closedness and boundedness assumptions cannot be dropped.
   - Intervals may be neither closed nor open.
2. Limit of a sequence
   - Definition.
   - Procedure of evaluating limit by definition.
   - Common mistakes.
3. Evaluate the following limits. Justify your answer using the definition.
   (a) $\lim\limits_{n} \left(\dfrac{5n^2 + 2n + 1}{3n^2 + n + 2} \right)$
   (b) $\lim\limits_{n} \left(\sqrt{n+1} - \sqrt{n} \right)$.
4. In this exercise, we compare the growth rates of some common sequences. Let $a > 1$.
   (a) Show that $\lim\limits_{n} \dfrac{a^n}{n!} = 0$.
   (b) Let $p \in \mathbb{N}$. Show that $\lim\limits_{n} \dfrac{n^p}{a^n} = 0$.