Unit III. Lessons distribution and self-assesment questions.

- Lesson 1. Sections 1; 2; 3.

  1. If $\{a_n\}$ converges, then it is bounded, and if it does not converge, then it is unbounded. True or false?
  2. If $\{a_n\}$ diverges, then it is unbounded; and, if it is bounded, then it does not diverge. True or false?
  3. Can $\{a_n\}$ not converge nor diverge nor be bounded? If it can, give an example.
  4. Find a convergent subsequence of an oscillating one.
  5. Does it exist a monotone sequence increasing and decreasing, but not convergent?
  6. Does a sequence of nested, closed, non-empty intervals determine a point?

- Lesson 2. Sections 4; 5.

  1. The quotient of convergent sequences converges to the quotient of limits. It is true?
  2. If $a_n \to 0$, the limit of the sequence $\{1/a_n\}$ is infinity. True or false?
  3. $1^n = 1$, $\forall n$ is true. So, if $a_n \to 1$, will the sequence $\{a_n^n\}$ have limit 1?
  4. Given $\{n\}$, calculate the limits of the arithmetic and geometric means of its terms.
  5. Given the sequence $\{a_n\}$, is it true that the limit of a_n/a_{n-1} is equal to that of $\sqrt[n]{a_n}$?

- Lesson 3. Sections 6; 7.

  1. Find two infinites of the same type, one negligible compared to the other.
  2. Find two infinites of different type, one negligible compared to the other.
  3. Give an example of non-equivalent infinites of the same order.
  4. Give an example of two equivalents infinitesimals.

- Lesson 4. Sections 8; 9.1.

  1. In a quotient, can we replace the numerator by an equivalent sequence?
  2. In a logarithm, can we replace the argument by an equivalent sequence?
  3. If $a_n \sim a_n'$, $b_n \sim b_n'$, then $a_n^{b_n} \sim a_n'^{b_n'}$. True or false?
  4. The limit of the sequence $\left\{(1 + 1/\sqrt{n})^{\sqrt{n}}\right\}$ is number e. True or false?

- Lesson 5. Sections 9.2 a 9.5.

  1. Are two polynomials in n, of the same degree, equivalent?
  2. Are the logarithms of two polynomials in n, of the same degree, equivalent?
  3. Are the nth roots of two polynomials in n, of the same degree, equivalent?
  4. To find the limit of a recurrent sequence, it is enough to take limits in the formula. True or false?
  5. How are indeterminations of type 0^0 usually resolved?