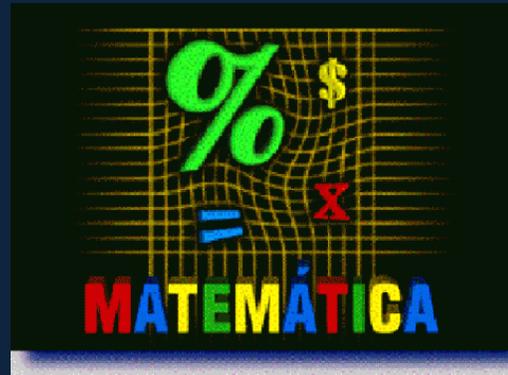


AP Calculus 12th grade
Coordinator: Emma Encarnación
Teacher: Livia Gourillova
Principal: Ana María Martijena



Contents:

1. Informal discussion of limit.
2. Finite limits: limit of a constant, one-sided limits.
3. Limits involving infinity:
4. Calculating limits using limits laws.
5. Nonexistent limits:
 - a) Different types of nonexistence
 - b) Infinite limits.
6. Limit theorem and continuity:
 - a) Graphical interpretation of continuity and discontinuity
 - b) Existence of absolute extreme of a continuous function on a closed interval
 - c) Intermediate Value Theorem and Extreme Value Theorem.
7. Special limits: trigonometric limits, Squeeze Theorem, limits of the exponential functions, and other special limits.
8. Formal definition of limit. Differentiation:
9. Calculation of the derivative by its limit definition.
10. Slope of a curve at a point, including points at which there are vertical tangents and points at which there are no tangents.
11. Tangent line to a curve at a point and local linear approximation.
12. The derivative as a rate of change: distinguish between average and instantaneous rate of change, applications.
13. Instantaneous rate of change as the limit of average rate of change, approximate rate of change from graphs and tables of values.
14. Differentiability and continuity.
15. The Product and Quotient Rules.
16. The Chain Rule and the General Power Rule.
17. Implicit differentiation: Use of implicit differentiation to find the derivative of an inverse function.
18. Analysis of curves, including the notions of monotonicity and concavity (beginning).

Recommended websites:

<http://math.dartmouth.edu>

<http://people.hofstra.edu>

<http://www.sosmath.com>

Students will be able to:

- Find the limit of a function using both graphical and tabular methods
- Calculate limits, including one-sided, using algebra.
- Interpret asymptotes in terms of graphical behavior.
- Compare relative magnitudes of functions and their rates of change.
- Develop an intuitive understanding of continuity.
- Understand continuity in terms of limits.
- Develop a geometric understanding of graphs of continuous functions.
- Judge the meaning, utility, and reasonableness of the results of symbolic manipulations, including those carried out by technology.
- Compute the derivative by its limit definition.
- Apply the concept of instantaneous rate of change and to the solution of problems.
- Manipulate graphing calculator and software to solve problems and verify the computed answers.
- Apply the Product and Quotient Rules.
- Compute derivatives of functions using the Chain Rule and the General Power Rule.
- Differentiate implicitly defined curves such as: conics, lemniscates, folium of Descartes, kampyle of Eudoxus, etc.
- Interplay between the geometric and analytic information about functions,
- Predict and to explain the observed local and global behavior of a function.

