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18.01 | Fall 2006 | Undergraduate

Single Variable Calculus

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More Info

Related Resources

[Tips for Success in Undergraduate Math Courses](#) by Jessica Purcell. Some very good advice for college calculus students. Read this carefully and do as it suggests.

[Common Errors in Undergraduate Mathematics](#) by Eric Schechter

[The calculus page problems list](#) problems by D. A. Kouba at UC Davis

Assorted Applets

The Web page contains a plethora of interesting resources to help you visualize important mathematical concepts. Most of these are Java applets, which run interactively as plug-ins in your web browser. To use them you must have Java enabled in your browser preferences - by default, it probably is already.

- Some Java applets from MIT's OpenCourseWare page for 18.013A:
    - [Operations on functions](#)
    - [Trigonometric functions](#)
    - [Slope of a line](#)
    - [Derivative and tangent line](#)
    - [Constant, linear, quadratic and cubic approximations](#)
    - [Numerical integration](#)
    - [Polar plotter](#)
    - [Curves in two dimensions](#)
- Function and Derivative Animations, by Przemyslaw Bogacki and Gordon Melrose (.avi files, can play e.g. with [Windows Media® Player](#))
- Java applets of secant lines and tangent lines:
    - [A smooth function](#)
- Animations of secant lines approaching (or not approaching) tangent lines (by Douglas N. Arnold):
    - [At a point of differentiability](#)
    - [At a point of non-differentiability](#) (the one-sided derivatives don't match)
    - [At another point of non-differentiability](#) (vertical tangent; the derivative is infinite)
- [Constructing functions that are continuous but *nowhere differentiable*](#) (!), applet from Maths Online
- [Chain rule](#) applet
- [First and second derivatives](#) applet (by Scott Sarra)
- More [first and second derivatives](#), with parameters you can tweak (applet from [Maths Online](#))
- [Zooming in on a tangent line](#) (animation by Douglas N. Arnold)
- [Linear approximation of *sin x* at 0](#) (applet from [UBC Calculus Online](#))
- [Finding a function's extremum](#), applet from [Maths Online](#)
- [Rolle's theorem and the mean value theorem](#) (applet from IES, [Manipula Math](#))
- [Numerical Integration Simulation](#) (by Joseph L. Zachary)
- [Direction field applet](#) (by Scott Sarra)
- [More direction field applets](#) (from [UBC Calculus Online](#))
- [Parametric equation applet](#) (by Scott Sarra)
- Cycloid animation ([AVI](#)) (by Przemyslaw Bogacki and Gordon Melrose)
- [Cycloid applet](#) (from [Maths Online](#))
- Computing arc length ([AVI](#)) (animation by Przemyslaw Bogacki and Gordon Melrose)
- Approximating arc length (applet by Daniel J. Heath)
- [Polar curve applet](#) (from IES, [Manipula Math](#))
- Several polar curve animations (by Przemyslaw Bogacki and Gordon Melrose):
    - limacons:
        - $r = 1 + sin\ t$ ([AVI](#))
        - $r = 3 - 2\ cos\ t$ ([AVI](#))
        - $r = 1 + 2\ cos\ t$ ([AVI](#))
        - $r = 3 - sin\ t$ ([AVI](#))
    - rose curves:
        - $r = 3\ cos\_(3t)\_$ ([AVI](#))
        - $r = 5\ sin\_(2t)\_$ ([AVI](#))
    - spiral: $r = t$ ([AVI](#))
    - circle: $r = cos\ t$ ([AVI](#))
- Converging and diverging series animations (by Przemyslaw Bogacki and Gordon Melrose):
    - $1 / N^{(1/2)}$ ([AVI](#))
    - $1 / N$ ([AVI](#))

Feedback

- $1 / N^2$ ([AVI](#))
  - $1 / N^{15}$ ([AVI](#))
- [Numerical tools for computing sequences / series](#) (from [Maths Online](#))
- [Power series grapher](#)

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