

The **BIG** ideas in AP Calculus

Limits- the y-value a graph approaches

Could be a “hole in the graph”

Try rationalization, factoring, etc. to see if limit can be found of simplified expression.

Also remember the special trig. limits which also create a hole in the graph

Limit from the left must equal limit from the right

Limits to infinity

Continuity

Derivatives- means “slope” or instantaneous rate of change

Rules: Power, Quotient, Chain, Log, Exponential

Also need to know Trig. and Inverse Trig. derivatives, and how to differentiate *implicitly*

Applications: Find average rate of change by finding slope *across* **two** points

Find instantaneous rate of change by evaluating the derivative at **one** point

Instantaneous rate of change of position is velocity

Instantaneous rate of change of velocity is acceleration

1st and 2nd derivative test to find intervals of inc/dec, concavity, max/min, etc.

Optimization problems(use 1st derive. Test to find max/min)

Read a derivative graph to determine intervals of inc/dec, concavity, max/min, etc. of the original functions

Integration(antiderivatives)- used to accumulate

Rules: Power, Log, Exponential. Note: all composite functions may use U-substitution

Also need to know Trig. and Inverse Trig. antiderivatives

Applications: Using left, right, midpoint and trapezoid approximations estimate area under a curve

The definite integral(1st FTC) can be used to find area between curve and any axis(above is positive and below is negative).

Integration can be used to accumulate quantity or calculate position over time when completed on a rate of change function

Solving a differential equation(separation of variables) and slope fields

2nd FTC(antiderivative of a derivative leaves original function)

Area between curves

Rotational and cross sectional volumes.

Theorems: MVT(derivatives and integrals), Rolle's, Extreme Value, Intermediate Value