Unit 1 Functions, Graphs, and Limits

Content Area:	Mathematics
Course(s):	AP Calculus AB
Time Period:	September
Length:	3 weeks
Status:	Published

Enduring Understandings

Algebra, trigonometry, and logarithms are essential tools for the study of calculus. The concept of a limit is one of the foundations of calculus. Continuous functions model real-life phenomena.

Essential Questions

How does the math that you previously studied relate to the math that you are going to be studying?

How do limits guarantee the continuity of a function?

When do limits fail to exist?

How are limits connected to the existence of vertical and horizontal asymptotes?

What is the difference between calculating a limit and evaluating a function at a point?

What are connections among theses presentations of functions; graphically, numerically, analytically or verbally?

Content

Red Hot Topics:

- * Rational Exponents
- * Simplifying expressions
- * Writing linear equations
- * Average rate of change

Vocabulary

Domain, range, independent, dependent variable, graph, function, absolute value, increasing, decreasing, linear, quadratic, polynomial, coefficients, degree, cubic, power, root,, reciprocal, rational, algebraic, trigonometric, exponential, logarithmic, translations, composite, limit, right-hand limit, left-hand limit, vertical asymptote, continuous at a point, discontinuity, removable discontinuity, jump discontinuity, horizontal asymptote, infinite limits, limits at infinity,

Skills

Evaluate functions using function notation Determine the domain and range of a function Explain the characteristics of a graph of a function including local and global behavior Apply the rules for transformations of a function Categorize classifications and combinations of functions Find limits: graphically, numerically, analytically Identify limits that fail to exist Construct an in formal definition of limit Identify properties of limits Formulate a strategy for finding limits Analyze cancelation and rationalization techniques Apply the Squeeze Theorem for evaluating limits Apply and categorize properties of continuity Apply the Intermediate Value Theorem Define and apply the concept of infinite limits and limits at infinity. Identify vertical and horizontal asymptotes

Standards

Unit 1: Collegeboard AP Calculus Standards

Students should be able to work with functions represented in a variety of ways: graphical, numerical, analytical, or verbal. They should understand the connections among these representations.

Student should be able to model a written description of a physical situation with a function, limit, differential equation, or an integral.

Student should be able to communicate mathematics and explain solutions to problems both verbally and in written sentences.

Students should be able to use technology to help solve problems, experiment, interpret results, and support conclusions.

Students should be able to determine the reasonableness of solutions, including sign, size, relative accuracy, and units of measurement.

Student should develop an appreciation of Calculus as a coherent body of knowledge and human accomplishment.