Limits

Analysis of graphs
Interplay between geometric and analytic information
Use of calculus to predict and explain observed local and global behavior of a function

Limits of functions (including one-sided limits)
An intuitive understanding of the limiting process
Calculating limits using algebra
Estimating limits from graphs or tables of data

Asymptotic and unbounded behavior
Understanding asymptotes in terms of graphical behavior
Describing asymptotic behavior in terms of limits involving infinity
Comparing relative magnitudes of functions and their rates of change (e. g., contrasting exponential growth, polynomial growth, and logarithmic growth)

Continuity as a property of functions
An intuitive understanding of continuity (close values of the domain lead to close values of the range)
Understanding continuity in terms of limits
Geometric understanding of graphs of continuous functions (Intermediate Value Theorem and Extreme Value Theorem)

Derivatives

Concept of the derivative
Derivative presented graphically, numerically, and analytically
Derivative interpreted as an instantaneous rate of change
Derivative defined as the limit of the difference quotient
Relationship between differentiability and continuity

Derivative at a point
Slope of a curve at a point, including vertical, nonexistent
Tangent line to a curve at a point; local linear approximation
Instantaneous rate of change as the limit of average rate of change
Approximate rate of change from graphs and tables of values

Derivative as a function
Corresponding characteristics of graphs of f and f'
Relationship between increasing and decreasing behavior of f and the sign of f'
The Mean Value Theorem and its geometric interpretation
Equations involving derivatives; translating words to symbols

Second derivatives
Corresponding characteristics of the graphs of f, f', and f''
Relationship between the concavity of f and the sign of f''
Points of inflection as places where concavity changes

Applications of derivatives
Analysis of curves, including monotonicity and concavity
Optimization, both absolute (global) and relative (local) extrema
Modeling rates of change, including related rates problems
Use of implicit differentiation to find the derivative of an inverse
Interpretation of derivative as a rate of change in varied applied contexts, including velocity, speed, and acceleration
Geometric interpretation of differential equations via slope fields and the relationship between slope fields and solution curves for differential equations

Computation of derivatives
Knowledge of derivatives of basic functions, including power, exponential, logarithmic, trigonometric, and inverse trig
Basic rules for derivatives of sums, products, and quotients
Chain rule and implicit differentiation

Integrals

Interpretations and properties of definite integrals
Definite integral as a limit of Riemann sums
Definite integral of the rate of change of a quantity over an interval interpreted as the change of the quantity over the interval:

$$\int_a^b f'(x)dx \ = f(b) - f(a)$$

Basic properties of definite integrals (incl. additivity, linearity)

Applications of integrals
Knowledge, techniques adapted to many applications
Emphasis is on setting up approximating Riemann sum and representing its limit as a definite integral
Specific applications include finding the area of a region, volume of a solid with known cross sections, average value of a function, distance traveled by a particle along a line, and accumulated change from a rate of change

Fundamental Theorem of Calculus
Use of the Fundamental Theorem to evaluate definite integrals
Use of the Fundamental Theorem to represent a particular antiderivative, and the analytical and graphical analysis

Techniques of antidifferentiation
Antiderivatives following from derivatives of basic functions
Antiderivatives by substitution of variables, incl. change of limits for definite integrals

Applications of antidifferentiation
Finding specific antiderivatives using initial conditions, incl. applications to motion along a line
Solving separable differential equations and using them in modeling. In particular, studying the equation $y' = ky$ and exponential growth

Numerical approximations to definite integrals
Use of Riemann sums (using left, right, midpoint values) and trapezoidal sums to approximate definite integrals of functions represented algebraically, geometrically, and by tables of values