Calculus

Number and Quantity

Compute and determine the reasonableness of results in mathematical and real world situations

1	Estimate limits from graphs or tables.
2	Estimate numerical derivatives from graphs or tables of data.
3	Prove statements using mathematical induction.

Algebra

Demonstrate basic knowledge of functions, including their behavior and characteristics

4	Predict and explain the characteristics and behavior of functions and their graphs (domain, range, increasing/decreasing intervals, intercepts, symmetry, and end behavior).
5	Investigate, describe, and determine asymptotic behavior using tables, graphs, and analytical methods
6	Determine and justify the continuity and discontinuity of functions

Evaluate limits and communicate an understanding of the limiting process

7	Solve mathematical situations and application problems involving or using derivatives, including exponential, logarithmic, and trigonometric functions.
8	Calculate limits using algebraic methods.
9	Verify the behavior and direction of non-determinable limits.

Use the definition and formal rules of differentiation to compute derivatives

10	State and apply the formal definition of a derivative.
11	Apply differentiation rules to sums, products, quotients, and powers of functions.
12	Use the chain rule and implicit differentiation.
13	Describe the relationship between differentiability and continuity.

Apply derivatives to find solutions in a variety of situations

15	Define a derivative and explain the purpose/utility of the derivative.
16	Apply the derivative as a rate of change in varied contexts, including velocity, speed, and acceleration.
17	Apply the derivative to find tangent lines and normal lines to given curves at given points.
18	Predict and explain the relationships between functions and their derivatives.
19	Model rates of change to solve related rate problems.
20	Solve optimization problems.

Calculus

Employ various integration properties and techniques to evaluate integrals

21	State and apply the First and Second Fundamental Theorem of Calculus.
22	Apply the power rule and u-substitution to evaluate indefinite integrals.

Geometry

Use geometric concepts to gain insights into, answer questions about, and graph various implications of differentiation

23	Demonstrate and explain the differences between average and instantaneous rates of change.
24	Apply differentiation techniques to curve sketching
25	Apply Rolle's Theorem and the Mean Value Theorem and their geometric consequences.
26	Identify and apply local linear approximations.
27	Analyze curves with attention to non-decreasing functions (monotonicity) and concavity.

Statistics and Probability

Adapt integration methods to model situations to problems

28	Apply integration to solve problems of area.
29	Utilize integrals to model and find solutions to real-world problems such as calculating displacement and total distance traveled.

Apply appropriate techniques, tools, and formulas to determine values for the definite integral

30	Interpret the concept of definite integral as a limit of Riemann sums over equal subdivisions.