2024-2025

Rapid City
Stevens High School

AP Calculus AB

RCAS Policies/Procedures:

Students will be required to follow all RCAS policies and procedures. To view the RCAS High School Student Handbook, click handbook.

Course Description:

This is an introductory study of differential and integral calculus including applications in the physical, natural, and social sciences. Topics studied include functions and their graphs, limits and continuity, the derivative and applications, and the integral and applications. Students may elect to take the AP Calculus exam at the conclusion of the course at their expense.

Textbook: Calculus for AP version 2e, Ron Larson and Paul Battaglia

Required Resources:

None

"Limited Choice" Resources: (students will be asked to choose at least one title from this list)

None

Student Choice:

Will student be asked to choose additional reading material from the classroom or school library?

No

Essential Questions:

BIG IDEA 1: CHANGE
o How can we use derivatives to describe rates of change of one variable with another?
o How can we use definite integrals to describe the net change in one variable over an interval of another?
o What is the relationship between integration and differentiation as expressed in
the Fundamental Theorem of Calculus?
• BIG IDEA 2: LIMITS
o How can we use the consequences of a limiting case to model real-world behavior?
o How can we use limits to develop important ideas, definitions, formulas, and theorems in calculus: for example, continuity, differentiation, and integration?
• BIG IDEA 3: ANALYSIS OF FUNCTIONS
o How can we use calculus to analyze the behaviors of functions by relating limits
to differentiation and integration and by relating each of these concepts to the
others?

Essential Learning Intentions:

Change 1 – I can use calculus to generalize knowledge about motion to diverse problems
involving change.
• Change 2 – I can use derivatives to determine rates of change at an instant by applying
limits to knowledge about rates of change over intervals.
• Change 3 – I can use derivatives to solve real-world problems involving rates of change.
• Change 4 – I can use definite integrals to solve problems involving the accumulation of
change over an interval
• Change 5 – I can use definite integrals to solve problems involving the accumulation of
change in area or volume over an interval.
• Limits 1 – I can use reasoning with definitions, theorems, and properties to justify claims
about limits.
• Limits 2 – I can use reasoning with definitions, theorems, and properties to justify claims
about continuity.
• Limits 3 – I can use reasoning with definitions, theorems, and properties to

determine a
limit.
• Limits 4 – I can use L'Hospital's Rule to determine the limits of some indeterminate
forms.
• Limits 5 – I can use geometric and numerical methods to approximate definite integrals.
• Functions 1 – I can use existence theorems to draw conclusions about a function's
behavior on an interval without precisely locating that behavior.
• Functions 2 - I can develop knowledge about the related behaviors of a function and its
derivative by recognizing that a function's derivative may also be a function.
• Functions 3 – I can use derivative rules to simplify differentiation.
• Functions 4 – I can use a function's derivative to understand some behaviors of the
function.
• Functions 5 – I understand that the Fundamental Theorem of Calculus connects
differentiation and integration.
• Functions 6 – I can apply knowledge of geometry and mathematical rules to simplify
integration.
• Functions 7 – I can solve differential equations to determine functions and develop
models