Calculus Syllabus

Central Sands Community High School | 2026–27

Study change and accumulation through limits, derivatives, and integrals. Connect algebraic, numerical, graphical, and verbal representations to solve problems and justify conclusions.

Course information

Subject: Mathematics Grade placement: 11 and 12 with prerequisite readiness
Credit:1
Instructor: Thomas Eston Whitfield
Schedule: Semester 2: 1:30–2:30 p.m.

Prerequisite readiness includes strong Algebra 2 skills and precalculus topics, including function composition, exponentials, logarithms, radians, and trigonometric functions. The instructor checks readiness at entry and provides targeted review.

Curriculum and materials

Oak Meadow calculus course materials. Assigned lessons are selected and sequenced by the teacher to match course targets and student readiness. Bring the assigned text, notebook, pencil, and teacher-approved calculator. Graphing or spreadsheet tools are used when they support the learning target.

Learning outcomes

- Analyze functions, domain and range; use algebraic and trigonometric relationships; distinguish average and instantaneous change.
- Estimate and evaluate limits; analyze one-sided limits and continuity; distinguish a function value from its limit.
- Use the difference quotient and limit definition; interpret tangent slope and instantaneous rate; relate differentiability to continuity.
- Apply power, product, quotient, and chain rules; differentiate common trigonometric, exponential, and logarithmic functions.
- Differentiate implicit relationships; calculate related rates; use local linear approximations.
- Use critical points and derivative signs; analyze increasing behavior and concavity; solve optimization problems; interpret the Mean Value Theorem.
- Approximate accumulation with sums; interpret signed area; use properties of definite integrals.
- Connect derivatives and integrals; find antiderivatives; evaluate definite integrals; apply basic substitution.
- Use integrals for net change, total change, average value, and area between curves; integrate rate and accumulation reasoning.

Instruction and practice

Students learn through teacher explanation and modeling, guided problem solving, discussion, independent practice, and applications. Placement and grouping reflect readiness. Regular teacher check-ins identify misconceptions and guide reteaching. Cumulative review keeps earlier skills active. Assigned practice includes written reasoning and worked steps; completing pages alone does not demonstrate competency.

Assessment and evidence of learning

- Diagnostic tasks identify starting skills and inform instruction; they do not replace course-level evidence.
- Formative evidence includes exit tickets, observation, notebook review, student explanations, and short skill checks. Feedback identifies a specific next step.
- Summative evidence includes independent unit assessments, application tasks, and a cumulative demonstration. Projects are evaluated for mathematical accuracy, reasoning, representation, and interpretation.
- The teacher maintains a target-by-target record showing the task, date, level of independence, demonstrated proficiency, and next step. Progress is communicated through school reporting procedures.

How competency is measured

Each target is evaluated using four descriptors: Beginning—needs substantial support; Developing—shows partial understanding or inconsistent application; Proficient—independently applies the skill, shows a valid method, and interprets the result; Extending—transfers the skill to a new situation and justifies or compares approaches. These descriptors guide evidence review and do not establish a new school grading policy. Credit and final reporting follow school requirements.

Feedback revision and reassessment

Students review errors, explain corrected reasoning, and complete targeted practice before reassessment. A new comparable task checks independent learning. The teacher considers the most recent consistent evidence while retaining earlier evidence to document growth. Homework completion and participation support learning but are recorded separately from mathematical proficiency.

Expectations and access

- Show mathematical thinking, label units and graphs, and check whether answers make sense. Ask questions and contribute respectfully to shared problem solving.
- Use tools only as authorized for the task. Cite outside assistance; submit individual reasoning for independent assessments.
- Arrange missed instruction and assessment with the teacher. Follow school attendance, academic integrity, and reporting policies.
- IEP and 504 accommodations apply. Supports may include chunked tasks, visual models, accessible text, additional processing time, and alternative ways to explain reasoning. Modified targets follow the student’s individualized plan.

Mathematical practices

Across all units, students make sense of problems, reason quantitatively, explain and critique arguments, model situations, choose tools, attend to precision, use structure, and identify repeated reasoning. The course outline connects these practices to unit tasks and observable evidence.