



Wilson Central School District  
Calculus I  
NCCC CAP: MAT 120 Calculus and Analytical Geometry I

**Unit 2: Limits**

Teacher: **Mrs. Lura Kingston**

Time Frame	Topics	Essential Questions	Standards	Skill: Students will be able to...	Resources	Specially Designed Instruction	Assessment / Common Assessments
September- October 1.5 weeks	Evaluating limits graphically & numerically. One-sided limits. Infinite limits. Average rate of change vs. instantaneous rates of change.	What is a limit? Why is the concept of a limit of the foundations of calculus? How do we use limits to understand how functions behave?	<a href="https://www.engage.org/content/precaluand-advanced-topics">https://www.engage.org/content/precaluand-advanced-topics</a>	Develop a definition of a derivative by connecting limits with instantaneous rates of change. Calculate the derivative of a function using the limit definition. Calculate limits graphically, algebraically. Determine one-sided limits. Determine and understand infinite limits. Determine the location of asymptotes using limits.	Teacher generated notes. TI-84 Plus. Teacher generated worksheets. Text: <i>Calculus Brief Edition</i> by Anton, Bivens, Davis. Kuta Software	Individual IEPs and 504 will be followed. It is the responsibility of the special education teacher, as the case manager, to ensure that the teacher access to their students IEPs.	Teacher generated: Unit test, Pop quizzes, Classwork, Homework.

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**Unit 3: Differentiation**

**Teacher: Mrs. Lura Kingston**

<p>October – End Q1 4 weeks</p>	<p>Slope. Derivatives, tangent lines, rates of change. Differentiation rules to find derivatives of different functions. Related Rates.</p>	<p>What is a derivative? How are derivatives used to model instantaneous rate of change? What is the connection between derivatives and the graph of a function?</p>	<p><a href="https://www.engage.org/content/precaluand-advanced-topics">https://www.engage.org/content/precaluand-advanced-topics</a></p>	<p>Determine the derivative of algebraic and trigonometric functions using the definition and the sum, difference, product, quotient, and chain rules. Find the equation of a tangent line to a curve at any point. Know the difference between explicit and implicit differentiation. Solve related rates word problems to solve real-life problems.</p>	<p>Teacher generated notes. TI-84 Plus. Teacher generated worksheets. Text: <i>Calculus Brief Edition</i> by Anton, Bivens, Davis. Kuta Software</p>	<p>Individual IEPs and 504 will be followed. It is the responsibility of the special education teacher, as the case manager, to ensure that the teacher has access to their students IEPs.</p>	<p>Teacher generated: Unit test, Pop quizzes, Quizzes, Classwork, Homework.</p>
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Midterm Review 3 days

Teacher generated Midterm Exam: 2 periods, 1.5 hours.

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**Unit 4: Graphical Applications of the Derivative**

**Teacher: Mrs. Lura Kingston**

Time Frame	Topics	Essential Questions	Standards	Skill: Students will be able to...	Resources	Specially Designed Instruction	Assessment / Common Assessments
November 3 weeks	Rolle's Theorem. Mean Value Theorem. 1 <sup>st</sup> Derivative Test. 2 <sup>nd</sup> Derivative Test	How does continuity and differentiability relate to function? How do derivatives allow for a deeper understanding of the property of the graphs? What is the connection between derivatives and the graph of a function? What is a critical number? How do we determine relative maxima and minima? How can we use derivatives to sketch a function?	<a href="https://www.engage.org/content/precalscuand-advanced-topics">https://www.engage.org/content/precalscuand-advanced-topics</a>	Prove if a function is continuous and/or differentiable. Understand and use Rolle's Theorem and the Mean Value Theorem. Students will be able to find maximum and minimum points of a function using the derivative and its properties. Determine when a function is increasing or decreasing by analyzing the critical numbers. Find intervals of concavity by analyzing the inflection points. Graph $f$ using information about $f'$	Teacher generated notes. TI-84 Plus. Teacher generated worksheets. Text: <i>Calculus Brief Edition</i> by Anton, Bivens, Davis. Kuta software	Individual IEPs and 504 will be followed. It is the responsibility of the special education teacher, as the case manager, to ensure that the teacher has access to their students IEPs.	Teacher generated: Unit test, Pop quizzes, Quizzes, Classwork, Homework.

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**Unit 5: More Applications of the Derivative**

**Teacher: Mrs. Lura Kingston**

<b>Time Frame</b>	<b>Topics</b>	<b>Essential Questions</b>	<b>Standards</b>	<b>Skill: Students will be able to...</b>	<b>Resources</b>	<b>Specially Designed Instruction</b>	<b>Assessment / Common Assessments</b>
December 1.5 weeks	Rectilinear Motion involving position, speed, velocity, and acceleration. Optimization problems with maximums or minimums on a given interval.	How does physics relate to calculus? What is the difference between average velocity and instantaneous velocity? How can derivatives be used to solve problems in everyday life?	<a href="https://www.engage.org/content/precaluand-advanced-topics">https://www.engage.org/content/precaluand-advanced-topics</a>	Use derivatives to analyze straight-line (horizontal) motion. Determine the instantaneous velocity and acceleration for vertical motion word problems.	Teacher generated notes. TI-84 Plus. Teacher generated worksheets. Text: <i>Calculus Brief Edition</i> by Anton, Bivens, Davis. Kuta software	Individual IEPs and 504 will be followed. It is the responsibility of the special education teacher, as the case manager, to ensure that the teacher has access to their students IEPs.	Teacher generated: Unit test, Pop quizzes, Quizzes, Classwork, Homework.

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**Unit 6: Antidifferentiation and Integration**

**Teacher: Mrs. Lura Kingston**

<b>Time Frame</b>	<b>Topics</b>	<b>Essential Questions</b>	<b>Standards</b>	<b>Skill: Students will be able to...</b>	<b>Resources</b>	<b>Specially Designed Instruction</b>	<b>Assessment / Common Assessments</b>
December – January. 3 weeks	The fundamental Theorem of Calculus. Antiderivatives of an indefinite integral, algebraic and trigonometric. Integration by u-substitution.	What is the connection between a derivative and its antiderivative? What is an integral? What is the Fundamental Theorem of Calculus?	<a href="https://www.engage.org/content/precaluand-advanced-topics">https://www.engage.org/content/precaluand-advanced-topics</a>	Determine antiderivatives of functions. Determine the value of a definite integral using the Fundamental Theorem of Calculus. Evaluate algebraic and trigonometric integrals. Evaluate integrals using u-substitution strategies.	Teacher generated notes. TI-84 Plus. Teacher generated worksheets. Text: <i>Calculus Brief Edition</i> by Anton, Bivens, Davis. Kuta software	Individual IEPs and 504 will be followed. It is the responsibility of the special education teacher, as the case manager, to ensure that the teacher has access to their students IEPs.	Teacher generated: Unit test, Pop quizzes, Quizzes, Classwork, Homework.

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**Unit 7: Applications of the Integral**

**Teacher: Mrs. Lura Kingston**

Time Frame	Topics	Essential Questions	Standards	Skill: Students will be able to...	Resources	Specially Designed Instruction	Assessment / Common Assessments
January 1.5 weeks	Rectangle Approximation Method (RRAM, LRAM, MRAM)	How can we estimate the area under a curve using geometric shapes? What is the relationship between limits and the area under a curve? How can we determine the area under the graph of a function? How do integrals allow for calculating the volume and area of solids?	<a href="https://www.engage.org/content/precalsuand-advanced-topics">https://www.engage.org/content/precalsuand-advanced-topics</a>	Approximate the area under a curve by using the Rectangle Approximation Method. Express the area under a curve as a definite integral. Compute the area under a curve using a numerical integration procedure. Find the volume of a solid using disk and washer methods. Calculate the arc length and surface area of a curve.	Teacher generated notes. TI-84 Plus. Teacher generated worksheets. Text: <i>Calculus Brief Edition</i> by Anton, Bivens, Davis. Kuta Software	Individual IEPs and 504 will be followed. It is the responsibility of the special education teacher, as the case manager, to ensure that the teacher has access to their students IEPs.	Teacher generated: Unit test, Pop quizzes, Quizzes, Classwork, Homework.

Calculus Final Exam Review: 1 week

Teacher generated Final Exam: 2 periods, 1.5 hours.