



Grade Level: 11/12

Content: Calculus AB

Year: 2022-2023

**Course Description/Rationale**

This course deals with limits of functions, differentiation of functions and integration of functions. Calculus will give the student a great background in higher-level math for college, particularly for mathematics and pre-engineering courses. Students must complete both semesters in order to receive a weighted grade. An opportunity to take the College Board AP Test will be given in the spring. **A graphing calculator is required for this class. A TI-84 will be sufficient for this and future math classes. If you are planning to major in engineering or something math related, a TI-Inspire is recommended.** Students will receive a weighted grade. (2 HS credits)

Name of Unit	Time Frame	Essential Learning Target	Standard(s)
Limits	2-3 Weeks	<ol style="list-style-type: none"> <li>1. Finding limits graphically, numerically, and analytically</li> <li>2. Finding limits to determine continuity</li> <li>3. Be able to find limits of polynomials</li> <li>4. Be able to find limits of rational functions</li> <li>5. Be able to find one sided limits</li> <li>6. Be able to find infinite limits</li> <li>7. Be able to use the squeeze theorem and IVT</li> <li>8. Be able to find limits of trig functions</li> <li>9. Be able to find limits of composite functions</li> <li>10. Be able to use limits to find vertical and horizontal asymptotes</li> </ol>	
Derivatives	3-4 weeks	<ol style="list-style-type: none"> <li>1. Finding derivatives using the limit definition</li> <li>2. Finding derivatives using the power rule, product rule, quotient rule, and chain rule</li> <li>3. Finding derivatives using implicit differentiation</li> <li>4. Finding derivatives of trig functions</li> <li>5. Know the properties of derivatives (constant multiple property, sum and difference property, etc.)</li> <li>6. Solving related rates problems</li> <li>7. Solving motion problems</li> <li>8. Finding derivatives of logs, exponentials, and inverse trig functions</li> </ol>	

		<p>9. Know and interpret what a limit is (slope of a tangent line, instantaneous rate of change, etc.)</p> <p>10. Know where a function is differentiable</p> <p>11. L'hopitals Rule to find limits</p>	
Uses of Derivatives	4 weeks	<p>1. Finding absolute mins/maxes of a function over an interval</p> <p>2. Find where a function increases and decreases</p> <p>3. Find where a function is concave up/down</p> <p>4. Find where a function has local/relative mins/maxes</p> <p>5. Be able to use the MVT and EVT</p> <p>6. Be able to use the first and second derivative tests to determine if a critical point is a min or max</p> <p>7. Be able to find a function's points of inflection</p> <p>8. Be able to solve optimization problems</p>	
Integration	8-9 weeks	<p>1. Be able to find antiderivatives using the power rule and u-substitution</p> <p>2. Know the basic integration rules (constant multiplication, sum and difference, etc.)</p> <p>3. Be able to estimate area under curves using Riemann Sums</p> <p>4. Be able to evaluate definite integrals using the Fundamental Theorem of Calculus</p> <p>5. Be able to find the area between two curves</p> <p>6. Be able to find the volume of a figure using the disc/washer method</p> <p>7. Be able to find the average value of a function over an interval</p> <p>8. Be able to integrate functions that result in natural logs, inverse trig functions, trig functions, etc.</p>	
Differential Equations	4 weeks	<p>1. Be able to draw slope fields</p> <p>2. Be able to solve basic differential equations</p> <p>3. Be able to solve differential equations using separation of variables</p> <p>4. Be able to solve growth and decay functions using differential equations</p>	

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|  |  | <ol style="list-style-type: none"><li>5. Be able to verify solutions to differential equations</li><li>6. Be able to find a particular solution to a differential equation</li></ol> |  |
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