# Calculus AB Schedule--Unit 1 Limits and Continuity

| Date | Lesson | HW Assignment |
|---|---|---|
| 15-Aug | Syllabus & Rules | *Review Syllabus & Rules* |
| 16-Aug | Intro to Calculus | **HW1**--Practice Using Sapling Learning |
| 17-Aug | Intro to Calculus (cont'd) | **HW2**--Video on Limits Graphically<br>**Study for Quiz on Summer Work** |
| 18-Aug | 1.1 Limits of Functions Using Graphical Techniques<br>**Quiz on Summer Work** | **HW3**--Calculator p.86 #18,19,22,26,37,40 |
| 19-Aug | 1.1 Limits of Functions Using Numerical Techniques | **HW4**--Calculator p.85 #8,9,12,14, p.89 AP Practice #6 |
| 22-Aug | 1.2 Analytical Techniques for Limits | **HW5**--NonCalculator p.99 #16,33,36,41, p.125 #13,23, p.127 AP Practice #2 |
| 23-Aug | ***Late Start Schedule***<br>1.2 Analytical Techniques for Limits | **HW6**--Calculator p.86 #33, NonCalculator p.100 #51,56,60bd,73 |
| 24-Aug | 1.5 Infinite Limits, Limits at Infinity | **HW7**--NonCalculator p.140 #19-24, p.143 AP Practice #5,11 |
| 25-Aug | 1.5 Infinite Limits, Limits at Infinity | **HW8**--NonCalculator p.140 #44,45,47,59, Video on Continuity<br>**Study for Quiz 1.1, 1.2, & 1.5** |
| 26-Aug | 1.3 Continuity<br>**Quiz 1.1, 1.2, & 1.5** | **HW9**--p.112 #13,17,18 |
| 29-Aug | 1.3 Continuity | **HW10**--Non-Calculator p.112 #23,25,27, p.116 AP Practice #4,8 |
| 30-Aug | ***Late Start Schedule***<br>1.3 Continuity | **HW11**--Non-Calculator p.113 #59,60,88,96,101 |
| 31-Aug | 1.3 Continuity | **HW12**--Non-Calculator p.113 #63,95, p.116 AP Practice #6,9,10 |
| 1-Sep | *Chapter 1 REVIEW*<br>*OPEN HOUSE 5:30pm-7:30pm?* | **HW13**--p.156 #1,10,16,29,32,44,52,61, p.159 AP Practice #2 |
| 2-Sep | **Unit 1 TEST** | **NO Additional Homework** |
| 5-Sep | **NO SCHOOL** -- Labor Day | **NO Additional Homework** |
| 6-Sep | ***Late Start Schedule***<br>AP Activity: Unit 1 | *AP Activity: Unit 1 Due 9/13* |

# Calculus AB Schedule--Unit 1 Limits and Continuity

## UNIT 1 : Functions, Graphs, and Limits

*Limits*

**LIM-1**
Reasoning with definitions, theorems, and properties can be used to justify claims about limits.

| LEARNING OBJECTIVE | ESSENTIAL KNOWLEDGE |
|---|---|
| **LIM-1.A** Represent limits analytically using correct notation. | **LIM-1.A.1** Given a function $f$, the limit of $f(x)$ as $x$ approaches $c$ is a real number $R$ if $f(x)$ can be made arbitrarily close to $R$ by taking $x$ sufficiently close to $c$ (but not equal to $c$). If the limit exists and is a real number, then the common notation is $\lim_{x \to c} f(x) = R$. |
| | **EXCLUSION STATEMENT** *The epsilon-delta definition of a limit is not assessed on the AP Calculus AB or BC Exam. However, teachers may include this topic in the course if time permits.* |
| **LIM-1.B** Interpret limits expressed in analytic notation. | **LIM-1.B.1** A limit can be expressed in multiple ways, including graphically, numerically, and analytically. |
| **LIM-1.C** Estimate limits of functions. | **LIM-1.C.1** The concept of a limit includes one sided limits |
| | **LIM-1.C.2** Graphical information about a function can be used to estimate limits. |
| | **LIM-1.C.3** Because of issues of scale, graphical representations of functions may miss important function behavior. |
| | **LIM-1.C.4** A limit might not exist for some functions at particular values of $x$. Some ways that the limit might not exist are if the function is unbounded, if the function is oscillating near this value, or if the limit from the left does not equal the limit from the right. |
| **LIM-1.C** Estimate limits of functions. | **LIM-1.C.5** Numerical information can be used to estimate limits. |
| **LIM-1.D** Determine the limits of functions using limit theorems. | **LIM-1.D.1** One-sided limits can be determined analytically or graphically. |
| | **LIM-1.D.2** Limits of sums, differences, products, quotients, and composite functions can be found using limit theorems. |
| **LIM-1.E** Determine the limits of functions using equivalent expressions for the function or the squeeze theorem. | **LIM-1.E.1** It may be necessary or helpful to rearrange expressions into equivalent forms before evaluating limits. |

*Continuity*

**LIM-2**
Reasoning with definitions, theorems, and properties can be used to justify claims about continuity.

| LEARNING OBJECTIVE | ESSENTIAL KNOWLEDGE |
|---|---|
| **LIM-2.A** Justify conclusions about continuity at a point using the definition. | **LIM-2.A.1** Types of discontinuities include removable discontinuities, jump discontinuities, and discontinuities due to vertical asymptotes. |
| **LIM-2.A** Justify conclusions about continuity at a point using the definition. | **LIM-2.A.2** A function $f$ is continuous at $x = c$ provided that $f(c)$ exists, $\lim_{x \to c} f(x)$ exists, and $\lim_{x \to c} f(x) = f(c)$. |
| **LIM-2.B** Determine intervals over which a function is continuous. | **LIM-2.B.1** A function is continuous on an interval if the function is continuous at each point in the interval. |
| | **LIM-2.B.2** Polynomial, rational, power, exponential, logarithmic, and trigonometric functions are continuous on all points in their domains. |
| **LIM-2.C** Determine values of $x$ or solve for parameters that make discontinuous functions continuous, if possible. | **LIM-2.C.1** If the limit of a function exists at a discontinuity in its graph, then it is possible to remove the discontinuity by defining or redefining the value of the function at that point, so it equals the value of the limit of the function as $x$ approaches that point. |
| | **LIM-2.C.2** In order for a piecewise-defined function to be continuous at a boundary to the partition of its domain, the value of the expression defining the function on one side of the boundary must equal the value of the expression defining the other side of the boundary, as well as the value of the function at the boundary. |

**LIM-2**
Reasoning with definitions, theorems, and properties can be used to justify claims about continuity.

| LEARNING OBJECTIVE | ESSENTIAL KNOWLEDGE |
|---|---|
| **LIM-2.D** Interpret the behavior of functions using limits involving infinity. | **LIM-2.D.1** The concept of a limit can be extended to include infinite limits. |
| | **LIM-2.D.2** Asymptotic and unbounded behavior of functions can be described and explained using limits. |
| **LIM-2.D** Interpret the behavior of functions using limits involving infinity. | **LIM-2.D.3** The concept of a limit can be extended to include limits at infinity. |
| | **LIM-2.D.4** Limits at infinity describe end behavior. |
| | **LIM-2.D.5** Relative magnitudes of functions and their rates of change can be compared using limits. |