

AP CALCULUS BC  
Unit 1 Outline – Limits and Continuity

DATE	CONCEPT	IN-CLASS SAMPLE PROBLEMS
8/12	<b>WELCOME</b>	Welcome to AP Calculus BC!  Sign up for AP Classroom
<b>HOMEWORK</b>		

DATE	CONCEPT	IN-CLASS SAMPLE PROBLEMS
8/13	<b>LIMITS REVIEW</b>	<b>Handout - Associating Limits with Graphs</b>  Evaluate each limit, if it exists.  <div style="display: flex; justify-content: space-around;"> <div> <b>Ex. 1</b> <math>\lim_{x \rightarrow 3} (x^2 - 2x + 5)</math> </div> <div> <b>Ex. 2</b> <math>\lim_{x \rightarrow -3} \frac{x^4 + x^2 - 1}{x^2 + 4}</math> </div> </div> <div style="display: flex; justify-content: space-around; margin-top: 20px;"> <div> <b>Ex. 3</b> <math>\lim_{x \rightarrow -2} \frac{x^3 - 1}{x + 2}</math> </div> <div> <b>Ex. 4</b> <math>\lim_{x \rightarrow 2} \frac{x - 2}{x^2 - 4}</math> </div> </div> <div style="display: flex; justify-content: space-around; margin-top: 20px;"> <div> <b>Ex. 5</b> <math>\lim_{x \rightarrow -2} \frac{x - 2}{x^2 - 4}</math> </div> <div> <b>Ex. 6</b> <math>\lim_{x \rightarrow 0} \frac{\sin x}{x}</math> </div> </div> <div style="margin-top: 20px;"> <b>Ex. 7</b> For <math>f(x) = \begin{cases} 4 + x^2, &amp; x &lt; 0 \\ x - \cos x, &amp; x &gt; 0 \end{cases}</math>, evaluate <math>\lim_{x \rightarrow 0} f(x)</math>.         </div>
<b>HOMEWORK</b>		Worksheet 1

DATE	CONCEPT	IN-CLASS SAMPLE PROBLEMS
8/14	<b>LIMITS INVOLVING INFINITY</b>	Define: Horizontal Asymptote; Vertical Asymptote  <b>Handout – Limits Involving Infinity and Asymptotes</b>  Evaluate each limit as either $\infty$ or $-\infty$ .  <div style="display: flex; justify-content: space-around;"> <div> <b>Ex. 1</b> <math>\lim_{x \rightarrow 0^+} \frac{-1}{6x}</math> </div> <div> <b>Ex. 2</b> <math>\lim_{x \rightarrow 3^+} \frac{5}{x - 3}</math> </div> <div> <b>Ex. 3</b> <math>\lim_{x \rightarrow 5^-} \frac{x + 3}{x - 5}</math> </div> </div> Principle of Dominance (Order of Magnitude) Evaluate each limit  <div style="display: flex; justify-content: space-around; margin-top: 20px;"> <div> <b>Ex. 4</b> <math>\lim_{x \rightarrow \infty} \frac{11}{x} - 6</math> </div> <div> <b>Ex. 5</b> <math>\lim_{x \rightarrow \infty} \frac{\sin 14x}{10x}</math> </div> <div> <b>Ex. 6</b> <math>\lim_{x \rightarrow -\infty} \frac{5x^3}{e^x - 4x^3}</math> </div> </div>
<b>HOMEWORK</b>		Worksheet 2

DATE	CONCEPT	IN-CLASS SAMPLE PROBLEMS
8/15	CONTINUITY	<b>Notes Handout – Continuity</b>  <b>Ex. 1</b> Verify that $f(x) = x^2$ is continuous at $x = 2$ .  <b>Ex. 2</b> Verify if $f(x) = \begin{cases} 3x^2 - 4x, & x < 1 \\ x - 2, & x \geq 1 \end{cases}$ is continuous at $x = 1$
HOMEWORK		Worksheet 3

DATE	CONCEPT	IN-CLASS SAMPLE PROBLEMS
8/16	CONTINUITY	<b>Types of Discontinuities</b>  <b>Ex. 1</b> What type of discontinuity does $f(x) = \frac{1}{x}$ have at $x = 0$ ?  <b>Ex. 2</b> What type of discontinuity does $f(x) = \frac{x-3}{x^2-9}$ have at $x = 3$ ? At $x = -3$ ?  <b>Removing a Discontinuity</b>  <b>Ex. 3</b> Define $g(5)$ in a way that extends $g(x) = \frac{x^2-25}{x-5}$ to be continuous at $x = 5$ .  <b>Ex. 4</b> Let $f(x) = \begin{cases} \frac{x^2-3x+2}{x^2-4x+3}, & \text{when } x \neq 1 \\ k, & \text{when } x = 1 \end{cases}$ . Find $k$ to make $f(x)$ continuous.  <b>Ex. 5</b> Let $f(x) = \begin{cases} \frac{x^2-16}{\sqrt{x}-2}, & \text{when } x \neq 4 \\ w, & \text{when } x = 4 \end{cases}$ . Find $w$ to make $f(x)$ continuous.
HOMEWORK		Worksheet 4

DATE	CONCEPT	IN-CLASS SAMPLE PROBLEMS
8/19	IVT, EVT, AND REVIEW	<b>Notes Handout</b>
HOMEWORK		Worksheet 5

8/20 – Unit 1 Review

8/21 – Exam