



June, 2021

Dear Student and Parent(s),

Welcome to your 2021-2022 AP Calculus AB Class! You have electively enrolled in this college level course, where based on your performance on the AP exam in May 2022, you may earn college credits in calculus.

**These classes meet promptly four days a week.** Attendance will be tracked: 3 tardies accumulate to one absence. *(Please, refer to the BKHS Parent and Student Handbook.)* We need to meet the standardized curriculum by mid-April to be ready for the scheduled national test in May 2022. These advanced placement courses are very demanding and may require additional hours of instruction. Students are strongly encouraged to attend optional office hours in the morning before school. A graphing calculator is required. While the TI-84 from your previous classes may work for many applications, in-class instruction will **use the TI-89**, which is **better suited for Calculus based** mathematics and is **highly recommended** for use in this course.

Calculus generalizes ideas and formulas from the constant to varying quantities. To move from the constant to the variable, it involves four stages: pre-calculus, the limit process, derivative calculus, and integral calculus. Congratulations! You have successfully completed the first stage, and you have been introduced to the second phase. I am excited that you are willing to continue to study through the next phases. In order to be on task for the next stage, I have attached a review assignment **due on the first day of class**, Thursday, August 12<sup>th</sup>, 2021. This material reviews the major concepts from your previous math classes, and highlights the foundational material necessary to be successful in a college level calculus course. To ensure you are prepared, we will go over questions on this material, **and then there will be an assessment of your understanding.**

Have a restful and productive summer. Manage your time wisely. I am looking forward to working with you next year!

Coach Curran

AP Calculus AB Teacher

# Calculus AB - Review Assignment

Textbook: Hughes-Hallett, Gleason, McCallum, et al. Calculus Single Variable. Seventh Edition. John Wiley & Sons, 2017.

## **Reading**

This class is based heavily on reading comprehension (know what a problem is asking), not just your ability to solve a problem. In keeping with maintaining a balance between concepts, modeling, and skills, the Calculus ideas in this textbook are presented graphically, numerically, symbolically, and **verbally** (the Rule of Four). Hence, I want you to read to help you build your Calculus vocabulary and to become familiarized with the textbook and the kinds of problems presented at the end of every section.

### Reading Assignment

- Preface: Page X: "To Students: How to Learn from this Book"

### Important Message From College Board

You should have successfully completed courses in which you studied algebra, geometry, trigonometry, analytic geometry, and elementary functions. In particular, you should understand the properties of linear, polynomial, rational, exponential, logarithmic, trigonometric, inverse trigonometric, and piecewise-defined functions and know how to graph these functions and solve equations involving them. You should also be familiar with algebraic transformations, combinations, compositions, and inverses for general functions.

## **Flash Cards**

As mentioned above, Calculus truly is a cumulative mathematics class where key problem solving skills and knowledge of properties and algebraic operations from previous classes is required in order to be successful. In addition, your verbal language skills are equally important in Calculus as your traditional problem solving skills. Below is a summary of the most important and commonly occurring vocabulary, formulae, graphs, properties, and concepts from your previous classes. Create Flash Cards for each topic, and I strongly encourage you to begin flipping through them once a week over the summer. The better you know these concepts the easier the year will be! Flash Cards will be checked on the first day of class along with the rest of the summer assignment.

- 1) Definition: Domain
- 2) Definition: Range
- 3) Definition: Average Rate of Change
- 4) Formula: Point Slope Equation of a Line
- 5) Definition: Increasing Function
- 6) Definition: Decreasing Function
- 7) Definition: Concave Up
- 8) Definition: Concave Down
- 9) Formula: Exponential Growth and Decay Equation
- 10) Even Functions
  - a. Examples of Typical Functions
  - b. Property of Even Functions
  - c. Symmetry of Graph
- 11) Odd Functions
  - a. Examples of Typical Functions
  - b. Property of Odd Functions
  - c. Symmetry of Graph
- 12) Function Notation
  - a. Definition
  - b. Interpreting Units
- 13) Inverse Functions
  - a. Definition
  - b. Notation
  - c. Interpreting Units
- 14) Property: Exponent Product Rule
- 15) Property: Exponent Quotient Rule
- 16) Property: Exponent Power Rule
- 17) Property: Negative Exponent Rule
- 18) Property: Fractional Exponent (Roots) Rule
- 19) Property: Product Property of Natural Logarithms
- 20) Property: Quotient Property of Natural Logarithms
- 21) Property: Power Property of Natural Logarithms
- 22) Non-Calculator Evaluation:  $\ln 1$
- 23) Non-Calculator Evaluation:  $\ln e$
- 24) Parent Graph: Exponential Functions
- 25) Parent Graph: Logarithmic Functions
- 26) Parent Graph: Quadratic Functions
- 27) Parent Graph: Cubic Functions
- 28) Parent Graph: Absolute Value Functions
- 29) Parent Graph: Square Root Functions
- 30) Parent Graph: Sine Function
- 31) Parent Graph: Cosine Function
- 32) Parent Graph: Tangent Function
- 33) Formula: Pythagorean Theorem

- 34) Non-Calculator Evaluation: Soh-Cah-Tao
- 35) Non-Calculator Evaluation: Special Right Triangles (in radians)
- 36) Property: Converting Trigonometric Angles (Degrees and Radians)
- 37) Property: Trigonometric Reciprocal Identities
- 38) Property: Trigonometric Quotient Identities
- 39) Property: Trigonometric Pythagorean Identities
- 40) Formula: Trigonometric Double Angle Formulas
- 41) Formula: Area of Rectangle
- 42) Formula: Area of a Triangle
- 43) Formula: Area of a Circle
- 44) Formula: Circumference of a Circle
- 45) Formula: Volume of a Cylinder
- 46) Formula: Volume of a Rectangular Solid
- 47) Formula: Distance Between Two Points
- 48) Formula: Factoring  $a^2 - b^2$

## Review Problems

### NON-CALCULATOR

1. Find the Average Rate of Change for the functions  $f(x) = 4x^2 - 3x + 2$  over the interval  $[1, 4]$
2. Solve the Inequality  $x^2 + 5x - 66 \leq 0$ . Write your answer in interval notation.
3. Find the value of the infinite sum  $\sum_{n=0}^{\infty} 18 \left(\frac{1}{3}\right)^{n+2}$
4. Evaluate without a calculator  $\sin \frac{\pi}{3}, \cos \frac{\pi}{2}, \tan \frac{\pi}{4}, \sin \pi, \cos \frac{5\pi}{6}, \sin \frac{3\pi}{2}$

### CALCULATOR

5. Find the zeroes for the function  $f(x) = \sqrt[3]{e^x - \sin x - 3}$
6. Find the intersection between the functions  $f(x) = 2x - 3$  and  $g(x) = 4e^{-x+1}$

### **Textbook Problems**

Refer to your Calculus Textbook for the indicated problems

- p. 7 #1, 5, 18, 23, 34
- p. 19 #7, 8, 17, 27, 38
- p. 28 #1, 11, 14, 32, 43, 44
- p. 36 #1, 3, 5, 11, 13, 17, 18, 36
- p. 45 #2, 3, 6, 10, 59, 68
- p. 54 4, 8, 9, 10, 20, 22, 36, 48, 62