

Bishop McGuinness Catholic High School
Calculus BC Summer Assignment 2026-2027
Instructor: Mr. Paul Smith, psmith@bmhs.us

For Calculus, you will need:

- (1) A 2" binder, which needs to be separate from other classes
- (2) A graphing calculator
- (3) Mr. Smith will be putting together a workbook for this course that will be copied at a local printer. More information on this will be put forth in mid-July, but please expect that you will be billed in Facts no more than \$50 for the purchase of this workbook. You will receive your copy at the start of the school year.**

(Note: If you would like a college-level textbook, I recommend the following book:
Stewart, James. *Single Variable Calculus: Early Transcendentals*. 7th ed. Belmont, CA: Thomson Higher Education, 2012.)

(Note #2: Although I list my e-mail above, I may not be available at times during the summer, so please do not expect me to always respond instantly).

There are two parts to your summer assignment: (1) a Delta Math assignment and (2) completion of the first couple of modules related to limits.

- (1) There will be a virtual summer packet on Delta Math that is designed to aid you in brushing up on foundational Precalculus skills needed to ensure your success in AP Calculus BC.

To sign up for Delta Math, follow these instructions:

A) Go to the following site: <https://www.deltamath.com/students?code=DK4B-3VA2> (or you can go to www.deltamath.com, click "For Students" and then "Register" and enter the class code DK4B-3VA2). This is the same login for all classes.

(B) Click register with e-mail, input your e-mail (Bishop McGuinness e-mail, please) and then click "Check E-mail".

(C) You'll have to enter your name and a password (please, again, use your real name or else you won't be able to get credit).

(D) Once you've gotten this, you'll be able to log in. You should see the two parts of the summer assignment posted there.

This virtual summer packet must be completed before school begins (due on 8/19/2026).

Students who have difficulty with the skills on the summer packet should consider using resources available on Delta Math/Khan Academy/YouTube etc. to be properly prepared for your upcoming math course.

Be prepared for an assessment on Pre Calculus topics within the first twelve days of class.

Please see list of things to know for this test below. I will spend limited time reviewing Pre Calculus material, so please come prepared to get into new Calculus material almost immediately. The sets of questions on Delta Math will give you an idea of what will be on this initial assessment. The sets are estimated to take you approximately 4 hours in total to complete.

Various things to know for the “Review” Test

Set #1

Functions: Writing equations of lines
Using rational exponents and radical form
Identify and evaluate functions and state their domains.
Use graphs of functions estimate function values, domains, ranges, intercepts.
Identify even and odd functions.
Determine intervals on which functions are increasing, decreasing, constant
Determine maxima and minima of functions.
Identify and graph parent functions and their transformations.
Perform algebraic operations on functions and find compositions.
Find inverse functions algebraically and graphically.

Set #2

Polynomials and Rationals: Divide polynomials using long division and synthetic division
Find real and complex zeros of polynomial functions (and state multiplicity of each root)
Graph polynomial functions
Find end behavior of polynomials
Analyze and graph rational functions (removable discontinuities aka “holes”, vertical/horizontal asymptotes)
Solve polynomial and rational inequalities

Set #3

Exponentials and Logarithms: Properties of exponentials and how to use them
Evaluate, analyze, and graph exponential and logarithmic functions
Converting between exponentials and logarithms
Properties of logarithms and how to use them (change of base particularly)
Solving exponential and logarithmic equations
Exponential growth and decay

Set #4

Trigonometry: Major unit circle values
Basic trigonometric identities (Pythagorean identities)
Trigonometric graphs (sine, cosine, tangent, cotangent, secant, cosecant)
Sum and difference formulas
How to use inverse trig to find angle measures
Solve trigonometric equations using algebraic techniques.

- (2) You will be asked to complete a set of videos and exercises on Khan Academy that will give you foundational knowledge for the first unit in Calculus and beyond.

To sign up for our Khan Academy class, go to the following site:

<https://www.khanacademy.org/join/XBFJDWJ7>

Use what you learned from the Khan Academy videos and articles to complete the summary sheet attached at the end of this document as preparation for the Chapter 1 test within the first twelve days of the school year (**summary sheet due on Wednesday, August 19th, 2026**). We will spend a short amount of time in class on these items before the Chapter 1 test.

I will not grade you on completion of the videos and articles on Khan Academy, ***but you will receive a homework grade (due Wednesday, August 19th, 2026) for completing the corresponding exercises on Khan Academy*** (usually have to get 4 questions right at the end of a section). Still, you will find it helpful to watch the videos to understand the concepts.

Name _____

AP Calculus BC Summary Sheet (Unit 1: Introductory Material)

An Introduction to Limits

What is a limit? Demonstrate your knowledge with a graph and a table below:

What does it mean for a limit to not exist (DNE)? Give a couple of graphical examples of limits not existing below:

What is a one-sided limit? Demonstrate using a graph below.

(BC Only) Suppose $\lim_{x \rightarrow a} f(x) = L$ and $\lim_{x \rightarrow a} g(x) = M$. Then

- | | |
|---|--|
| (1) $\lim_{x \rightarrow a} [f(x) \pm g(x)] =$ _____
(3) $\lim_{x \rightarrow a} [f(x)g(x)] =$ _____
(5) $\lim_{x \rightarrow a} c =$ _____ | (2) $\lim_{x \rightarrow a} [cf(x)] =$ _____
(4) $\lim_{x \rightarrow a} \left[\frac{f(x)}{g(x)} \right] =$ _____
(if M is not _____)
(6) $\lim_{x \rightarrow a} x^n =$ _____ |
|---|--|

(BC Only) What technique do we normally use to find the limit of a function? How do we find the limit of a piecewise function?

An Introduction to Rates of Change and Derivatives

What is the derivative and how does it connect to slope? Use a graph to demonstrate your answer.

What is a secant line and how do we find the slope of that secant line? Use a graph to demonstrate your answer.

Name three types of notation we can use for a derivative:

What is a tangent line and how do we find the slope of that tangent line? Use a graph to demonstrate your answer.

Interpreting a Derivative

How can we estimate a derivative using a table of values?

Mr. Smith will use the acronym “TAU” to guide your description of a derivative in context. “TAU” stands for Time, Amount, Units. Use an example from the videos to show how we can interpret a derivative in context using “TAU”.

How do we determine the units of a derivative? What about the derivative of a derivative?

How can we tell from the graph of a function which derivative value is bigger? Use an example graph to demonstrate your reasoning.

An Introduction to Integrals

What is a definite integral and what does it measure? What sort of units do we get when we find a definite integral? Connect your answer to the term “accumulation”.

How can we use rectangles to approximate the area under a curve? Provide a visual and an example of how to use Left, Right and Midpoint Riemann Sums along with a Trapezoidal Sum.

How do we know if a Left Riemann sum has over or under approximated the true area? How about a Right Riemann sum?