Calculus Summer Assignment

In your previous high school math courses, you have studied several different tools to understand and make predictions for real world situations. These tools are called Functions, and you looked at the three main representations (Table, Graph, and Equation) to help solve problems. The downside of your studies is that you looked at functions where the change happened over time. Yet, what happens if you wanted to look at change at one specific moment? Well, Calculus will help you as it is the study of instantaneous change or change at a moment.

Calculus is split into two distinct studies: The study of Derivatives and the study of Integrals. Both are essential in modeling and understanding change in our world. It will be your duty to understand what these two tools are and how to apply them in the world. To help you do this, you will be required to do the following over the summer:

Read *Calculus Better Explained by Kalid Azad* or use the website <https://betterexplained.com/guides/calculus/> (Each Lesson corresponds to the chapters of the book)

As you read, answer the following questions:

Chapter 1/Lesson 1

1. Explain in your own words how to get the area of a circle from the circumference
2. Explain in your own words what Calculus can help you do.

Chapter 2/Lesson 2:

1. Summarize each analysis in one sentence. Then identify the advantage of each.
2. How could you use x-rays and time lapses to build a sphere

Chapter 3/Lesson 3:

1. Explain the connections between Circumference, Area, Volume, and Surface Area using X-Rays and Time Lapses.
2. Why is math notation needed?

Chapter 4/Lesson 4:

1. How are derivatives related to the x-ray process?
2. How are integrals related to the time lapse process?
3. Describe each process using Calculus: ring by ring, slice by slice, and board by board.
4. How could you use Calculus language to move from Volume to Surface Area?

Chapter 5/Lesson 5:

1. Summarize chapter 5 in your own words.

Chapter 6/Lesson 6:

1. What are the similarities and differences between division and differentiation?
2. What are the similarities and differences between multiplication and integration?

Chapter 7/Lesson 7:

1. Explain why the derivative of mx where m is a constant is just m.
2. Explain why the integral of m is mx.
3. What are the similarities and differences between an indefinite integral and a definite integral?

Chapter 8/Lesson 8:

1. Summarize the chapter in your own words.

Chapter 9/Lesson 9:

1. Summarize the chapter in 2 to 3 sentences.

Chapter 10/Lesson 10:

1. Explain why n your own words that 2x is the derivative of and 2x+1. Refer to chapter 8 to help you.

Chapter 11/Lesson 11:

1. Explain Part I and Part II of the Fundamental Theorem of Calculus in your own words.

Chapter 12/Lesson 12:

1. Explain the process of finding the derivative of addition and multiplication in your own words.

Chapter 13/Lesson 13:

1. Think of as a growing cube.
   1. What dimension should the derivative have?
   2. How many viewpoints should
   3. What is the derivative? Does it make sense?

Chapter 14/Lesson 14:

1. Explain the derivative of in your own words
2. Explain in your own words.
3. Find the following

Your answers must be shared with me via Google Docs by Friday August 25, 2017 11:59 pm, but I will accept the project anytime earlier. Please title your document with your Last Name and Calc Summer Assignment. This will be your first Formal Grade of the year.

If you have any questions, please feel free to email me at [jserra@micharter.org](mailto:jserra@micharter.org) . I will respond as soon as I can.