Trig and Calculus Learning from a Computer Scientist's Perspective

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Abstract

In this paper, I explore the process of learning trigonometry and calculus from the perspective of a computer scientist. I begin with an overview of my background in computer science, highlighting how it has shaped my approach to mathematical concepts. Following this, I delve into my experiences with mathematical learning, discussing the challenges and the insights gained. Additionally, I present key questions I had before and after learning these mathematical fields, and reflect on their practical applications within computer science.

1 Introduction

1.1 Background

I am a computer scientist in training, with a background in software engineering and computer programming, focusing on data structures and algorithms. My interest in mathematics has always been present, but it was not until I began studying computer science that I realized the depth of my passion for the subject. I have always been fascinated by the intersection of mathematics and computer science, and I am constantly seeking ways to deepen my understanding of both fields. I believe that a strong foundation in mathematics is essential for any computer scientist, and I am committed to developing my mathematical skills to enhance my work in computer science.

1.2 Experiences with Mathematical Learning

My experiences with mathematical learning have been mostly positive, but I have encountered some challenges along the way. I have always been a strong student in mathematics, and I have consistently performed well in my math courses. I cared more about the enjoyment of solving problems than the grades. However, I have always struggled with mental math and have had to work hard to improve my skills in this area. I have also found that I learn best when I can see the practical applications of the mathematical concepts I am studying. I am a very hands-on learner, and I benefit greatly from working on real-world problems that require me to apply the mathematical concepts I have learned.

I know of trigonometry but have not studied it in depth. Furthermore, I lack a deep understanding of the trigonometric functions and their properties, and I have not yet explored the applications of trigonometry in computer science. The highest level of math I have completed is algebra 2, and I have not yet taken a calculus course. I am eager to learn more about trigonometry and calculus and to deepen my understanding of these mathematical fields.

1.3 Goals for Mathematical Learning

I have several goals for my mathematical learning. First and foremost, I want to develop a deep understanding of trigonometry and calculus and to be able to apply these concepts to real-world problems. I want to learn how to use trigonometry to model and solve problems in computer science, such as graphics and animation. I also want to learn how to use calculus to model and solve problems in computer science, such as optimization and machine learning. Additionally, I want to improve my mental math skills and my ability to work with mathematical concepts quickly and accurately. I believe that achieving these goals will enhance my work in computer science and enable me to tackle more complex and challenging problems in the field.

1.4 Questions About Trigonometry and Calculus

Before learning trigonometry and calculus, I have several questions about these mathematical fields. For trigonometry, I am curious about why radians are used sometimes instead of degrees, and I want to know what the practical applications of trigonometry are in computer science. For calculus, I am curious about what limits are and why they are important, and I want to know how to find the instantaneous rate of change of a function. I am also interested in learning about the different types of calculus, such as differential calculus and integral calculus. I hope to explore these questions and gain a deeper understanding of trigonometry and calculus as I continue my mathematical learning journey.

1.5 Plan for Learning Trigonometry and Calculus

To achieve my goals for mathematical learning, I have developed a plan to study trigonometry and calculus. I will begin by reviewing the basic concepts of trigonometry, such as the trigonometric functions and their properties. I will then move on to more advanced topics, such as trigonometric identities and equations. Most importantly, I will learn how to apply trigonometry to real-world problems in computer science. After completing my study of trigonometry, I will begin studying calculus. I will start with the basic concepts of calculus, such as limits and derivatives, and then move on to more advanced topics, such as integrals and differential equations. I will also learn how to apply calculus to real-world problems in computer science. By following this plan, I hope to deepen my understanding of trigonometry and calculus and to achieve my goals for mathematical learning.

2 Trigonometry

2.1 Problems

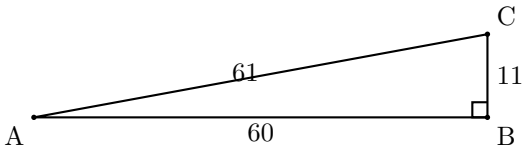

Figure 1: Right triangle with labeled sides and vertices

Choose the correct answer for Figure 1:

$$\text{A)} \quad \sin A = \frac{61}{11}$$
$$\text{B)} \quad \sin A = \frac{60}{61}$$
$$\text{C)} \quad \sin A = \frac{11}{61}$$
$$\text{D)} \quad \sin A = \frac{11}{60}$$

[1]

[1]Source: Math10, *Trigonometry Problems*, `https://www.math10.com/problems/trigonometry-problems/easy/`