SIT190

Introduction to Functions, Relations and Graphs

Learning Summary Report

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Self-Assessment Details

The following checklists provide an overview of my self-assessment for this unit.

	Pass (D)	Credit (C)	Distinction (B)	High Distinction (A)
Self-Assessment				✓

Self-Assessment Statement

Declaration

I declare that this portfolio is my individual work. I have not copied from any other student's work or from any other source except where due acknowledgment is made explicitly in the text, nor has any part of this submission been written for me by another person.

Signature: **Ethan Cowlishaw**

Portfolio introduction

I believe I deserve a high distinction. My work throughout the portfolio shows my dedication to supplying work to a high standard and delivering it on time.

I started from a mathematical desert where I felt incompetent and unable to perform mathematics past basic algebra. I struggled to understand how to apply rudimentary principles like BODMAS as it felt contradictory to me in the way it was applied.

Learning to move past negative feelings I had about mathematics being impossible for me was perhaps the greatest challenge at the beginning. There were often pervasive moments where I felt like giving up as the problems felt as though they were advancing too fast and to a point way out of my skill level. I was already on my way to shedding old ghosts, so these moments were often fleeting. I had a main goal of wanting to do the absolute best I could in the face of complete and utter confusion. I knew I had to do the best I could as I have hobbies (game development) and career goals that require more complex mathematics than the simple algebra I knew. My goal was enough of a driving force to push me to go beyond what I thought I was capable of and proved to me that given enough commitment to difficult problems, a solution can be found both in a literal sense and in a metaphorical sense.

I am now capable of performing basic calculus, basic trigonometry, operations on cubics, quadratics and more. I can execute tasks like drawing accurate graphs to inform me of how to best approach problems. I now understand what a logarithm is and does rather than being worried about them. While all of this is important, I believe the most important task I am capable of is knowing how to find, calculate, and troubleshoot the answers I need for a given problem.

Through my study, I have collated theory and practical class-based experience into a useful tool (Obsidian.md) that I will be able to physically reference and utilise in real-life problems I have encountered. A problem that I was encountering was trying to predict where a projectile would land which would require the use of the displacement equation $s = v_i t + \frac{1}{2}at^2$. I had no reference point on understanding how this equation found the displacement. My new knowledge of functions has allowed me to see past the initially overwhelming number of variables and accept that it is an appropriate model for finding displacement. Acceptance of and intense deliberation over mathematical concepts have been common themes throughout this course for me. 4.2C (task 1 and 2) helped me see the purposes of functions and 6.1P (task 3) gave me good footing in understanding what exactly a function is.
Another example is the use of trigonometry to make a program that reflects beams of light. I required knowledge of what things such as 'normal' are, what sin and cos actually do, how to find angles of vectors to find reflection points in 3D space and so on. The 6.2HD was pivotal in my understanding of the applications of trigonometry. I have been attempting to create this so I can make puzzles for games, and now that I have time away from university, I can now attempt to utilise my new knowledge to create this program.

As a last example, the purposes calculus of calculus being slowly revealed over the last 4 weeks of classes with content felt like a great fog had been lifted. I gradually understood this incredibly daunting monolith from my youth. Moments where I saw others complain about calculus being difficult - "You think this is hard? Try calculus…" made me never want to attempt or even look at it. I can now do it though.

Being able to be used for finding the area of curves has been a serious turning point in my understanding of mathematics. I have been able to see so many new opportunities for development from this. I had a moment during a workshop where I understood that definite integrals were incredibly useful so I searched up ways they could be used. I learnt calculus has applications in physics, geometry, engineering, and more. I have always been curious on how to find the displacement of objects as mentioned in my previous example – now I can do that and visualise it.

With differentiation, I learnt that through it and specifically in 7.1P, that I could see moments in time frozen in a graph and find the exact moment an event occurred. This was exciting as I have had a keen interest on the microscopic ever since I was young. Seeing a precise moment in time was like seeing a mathematical version of a bacteria.

Reflections

What was your chosen persona: Magi, Knight, Squire, or Page?

I chose the Knight as it related to my expectations of immense effort to get low grades. In my heart I was the Page. I attempted a lot of my tasks with as little help as I could manage, intended to foster a mathematical independence by doing so. I sometimes went too far in this degree where I spent hours upon hours doing the same thing with no results when I should have asked for help. In these hours, I usually found many resources which I skim read and deemed useless. I should focus more to see if it truly is helpful, or perhaps find a lesson that I could learn rather than avoiding it nearly immediately.

I was in contact with a few other classmates, and I helped them understand questions, at least from my perspective. I tried my best to not lead them astray.

The most important things I learnt:

The main goal of enrolling in this unit was to improve at mathematics. More specifically, I wanted to understand trigonometry better and to begin my journey to understanding calculus. I strongly believe I achieved that target as I have an increasingly in-depth knowledge of mathematics where I improve each day, I understand trigonometry better, calculus is a tool I am excited to use more, and I have passed all my assessments to the highest standard I was capable of.

I feel I learnt these topics, concepts, and/or tools really well:

I picked up fractions well, meaning I can now do them fast and accurately. I do still struggle to simplify complicated fractions but I can mentally simplify basic fractions with ease.

I understand matrices to a relatively high degree where I believe I could perform large operations if given enough time.

I am confident in integrating and differentiating in calculus but I do not fully understand the theory behind either.

I found the following topics particularly challenging:

By far the most challenging moments was during learning logarithms. I could look at them for long periods of time and struggle to understand how the outputs of logarithms connected to exponents. This led to hours of frustration over not being able to swap them back and forth without excessive amounts of time spent on trying to do so.

I now understand how logarithms and exponents relate to each other. I can not say I have mastered them as I still need more time than is seemingly necessary to convert them but I definitely have grown stronger in them.

Through my struggles with logarithms, I learnt that sometimes letting the problem go for the day is necessary. Trying the best you can for every moment of a problem is feasible only until the exhaustion kicks in. I found a rest, usually sleeping, helps greatly understanding problems better the next day.

I found the following topics particularly interesting:

The general ability to do mathematics without flailing has been the most valuable skill I have learnt from this unit. I feel much more competent at doing calculations and have been able to apply it in daily life. The topic I am most excited about is calculus. It is like the purpose of mathematics is being revealed in it. It can solve practical problems that are too arduous or impossible to solve using algebra.

I still need to work on the following areas:

I intend to study more into the purposes of trigonometry and calculus and finding how to utilise them in game development. I do not intend to study next trimester but I will continue to exercise these new skills through practice and finding practical purposes of my skills.

The things that helped me most were:

The YouTube channel Organic Chemistry Tutor assisted with my understanding of functions. The site MathsAtHome broke questions and topics down into well-written essays that explained every step of the way, leaving no room for error in interpretations. The sites that I used the most were Desmos graphinc calculator, Symbolab and WolframAlpha. Having a precise answer to aim for helped tremendously with my understanding. I paid for the step-by-step calculations to find the ways I could learn new methods of solving equations, functions, integrals, etc. and for verifying my answers (author's note: I never copied the step-by-step without extensive research into how it worked).

My progress in this unit was …:
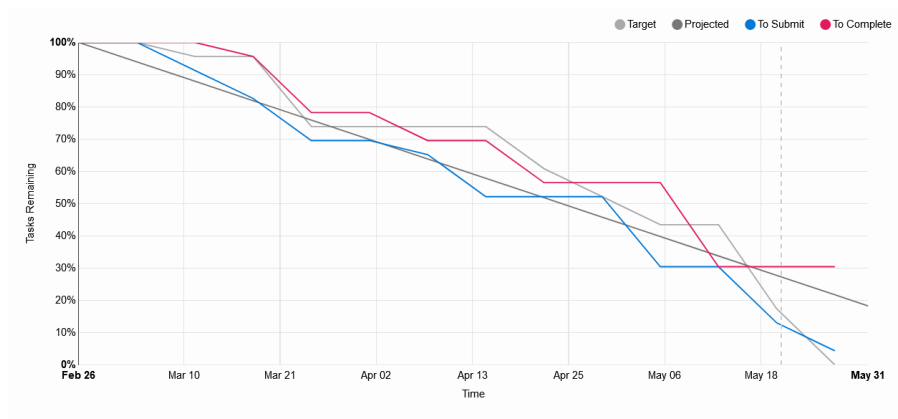
From the graph you can see that I followed the target line fairly closely. This is evidence that I cared strongly about the deadlines given and committed to completing my work quickly and to a high standard.

If I did this unit again, I would do the following things differently:

I wish I studied more into the theory behind equations. I understand how to use equations to find answers and only partially the theory. I have such a hard time understanding the equations themselves so taking that into account, the theory can seem incomprehensible. I should aim to study more efficiently.