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Calculus I

Second Partial Project

MATHEMATICS PROJECT

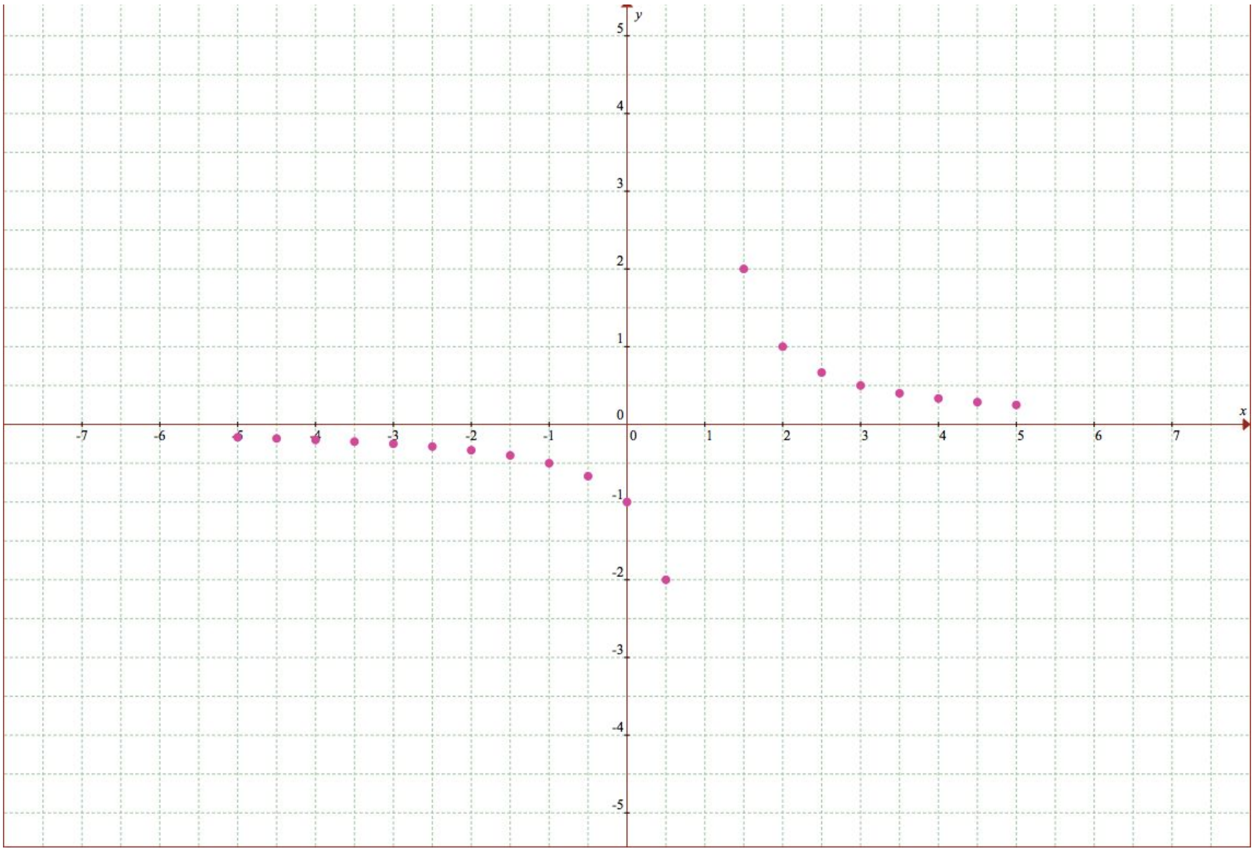
INTRODUCTION

The purpose of this project is to learn the different types of behaviors from the graphs that we have been seeing throughout our high school studies, also learning how to get the equation of a graph just by looking at its key points, such as their intersections with the x and y axis. We know that different graphs can consist of motion, position, acceleration and also a velocity.

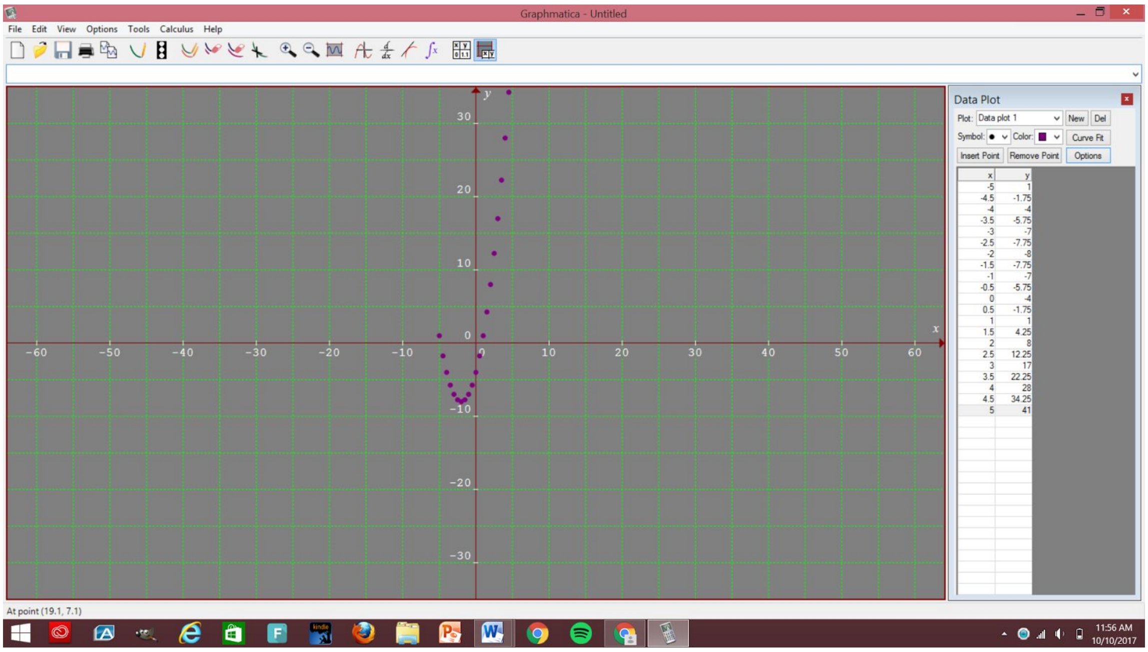
Motion: Is the action of changing location or position, or even just changing an object's position.
Position: This is precisely where an object is located, and it is a crucial part for
Velocity: Precisely how fast an object is moving.
Acceleration:Precisely how fast an object's speed is changing.

By analyzing every graphs behavior, we can place different points and use them in different formulas, such as the one to find the slope of a given section or part of a line. With help of graphmatica program, we are looking to comprehend all behaviors, equations and their respective derivatives to find their velocity coefficients, as well as calculating their average acceleration.

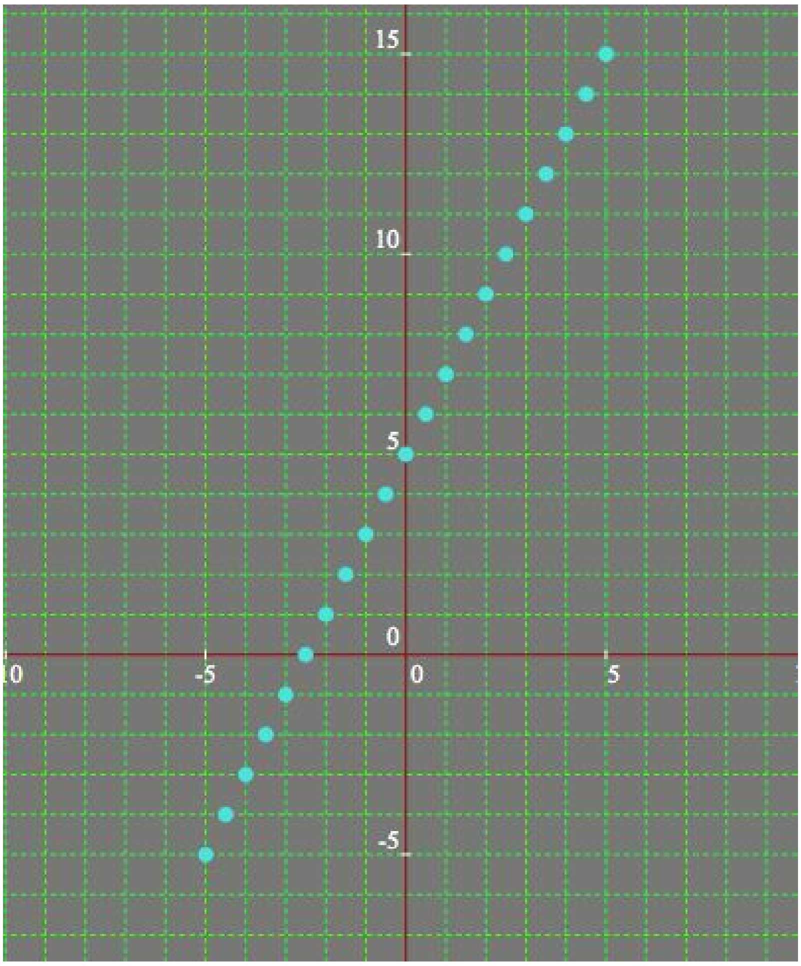
1. $f(t)= 0.7355\sin(0.6677x + 6.1333) + 0.06$



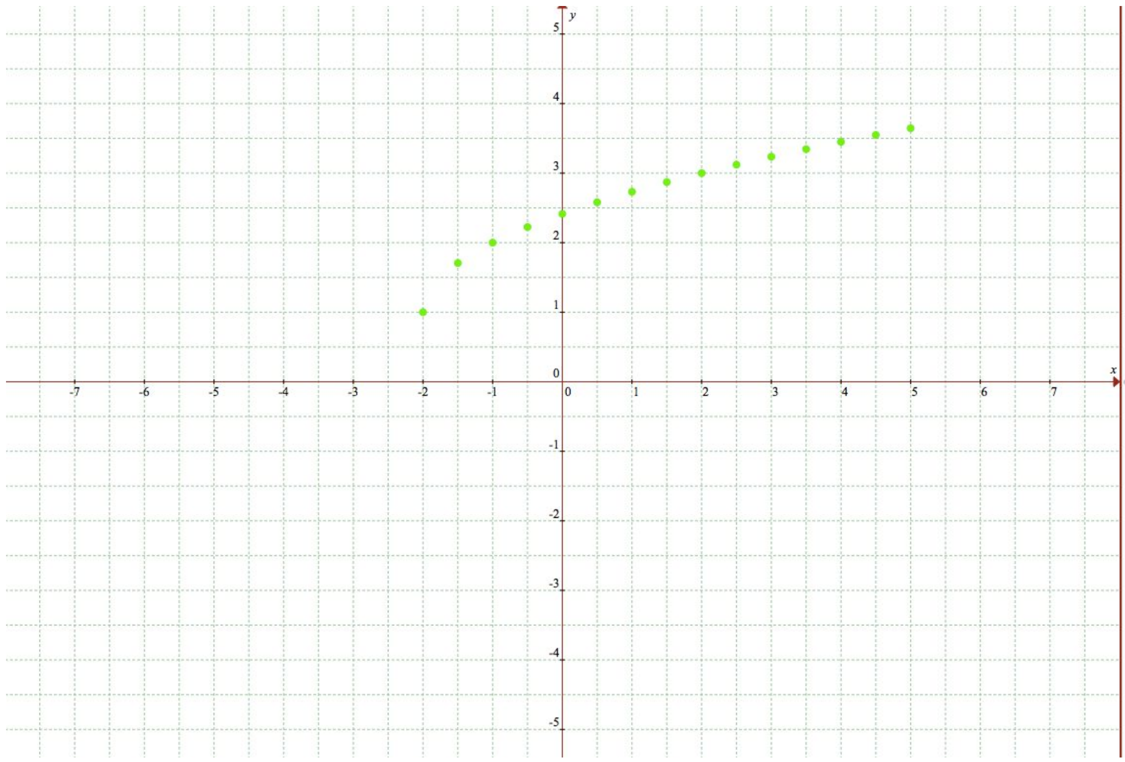
2. $g(t)= x^2+4x-4$ $V= 2x+4$ $A=2$



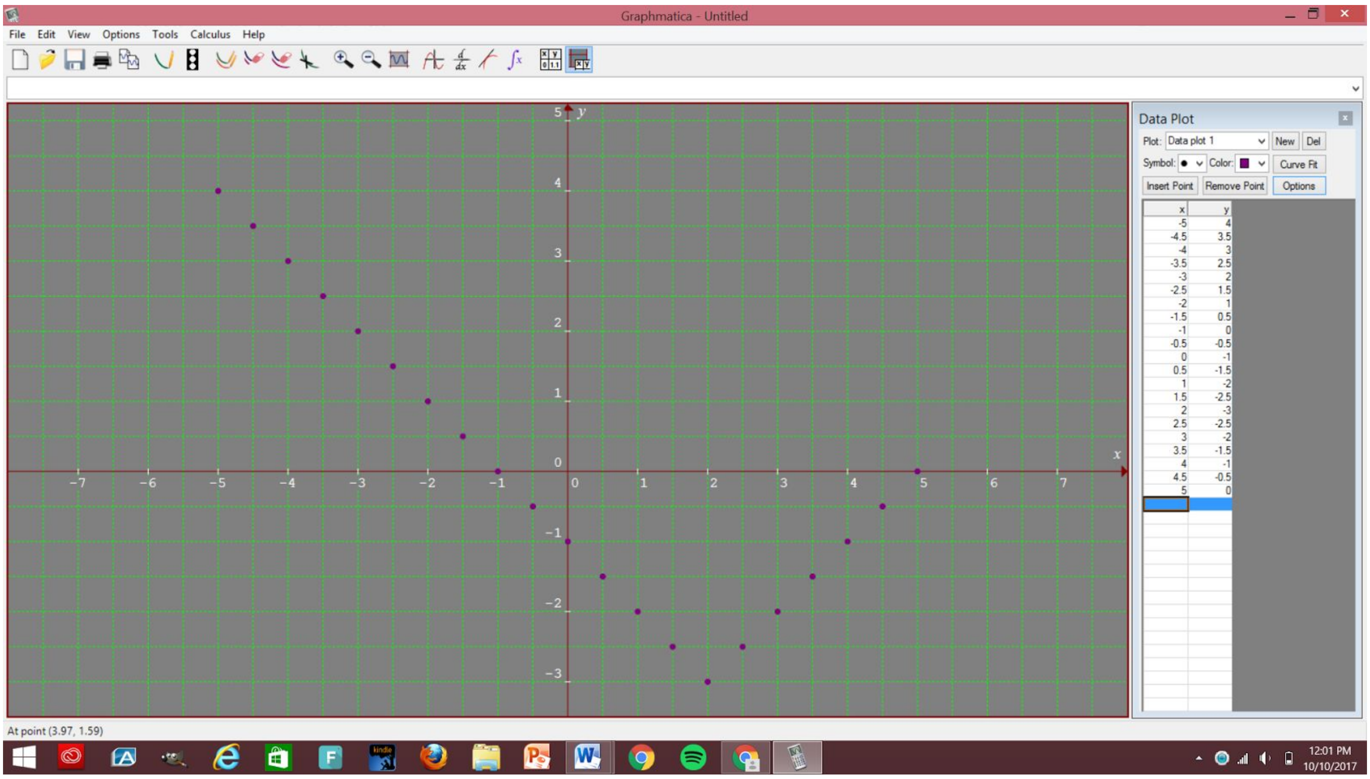
3. h(t)= 2x+5   v=2m/s a=0m/s^2



4. F(t)=-0.0037x^4 + 0.0328x^3 - 0.0954x^2 + 0.345x + 2.4582
V=0.0148x^3+0.984x^2-.1908x +.345
A=0.444x^2+1.968x-.1908

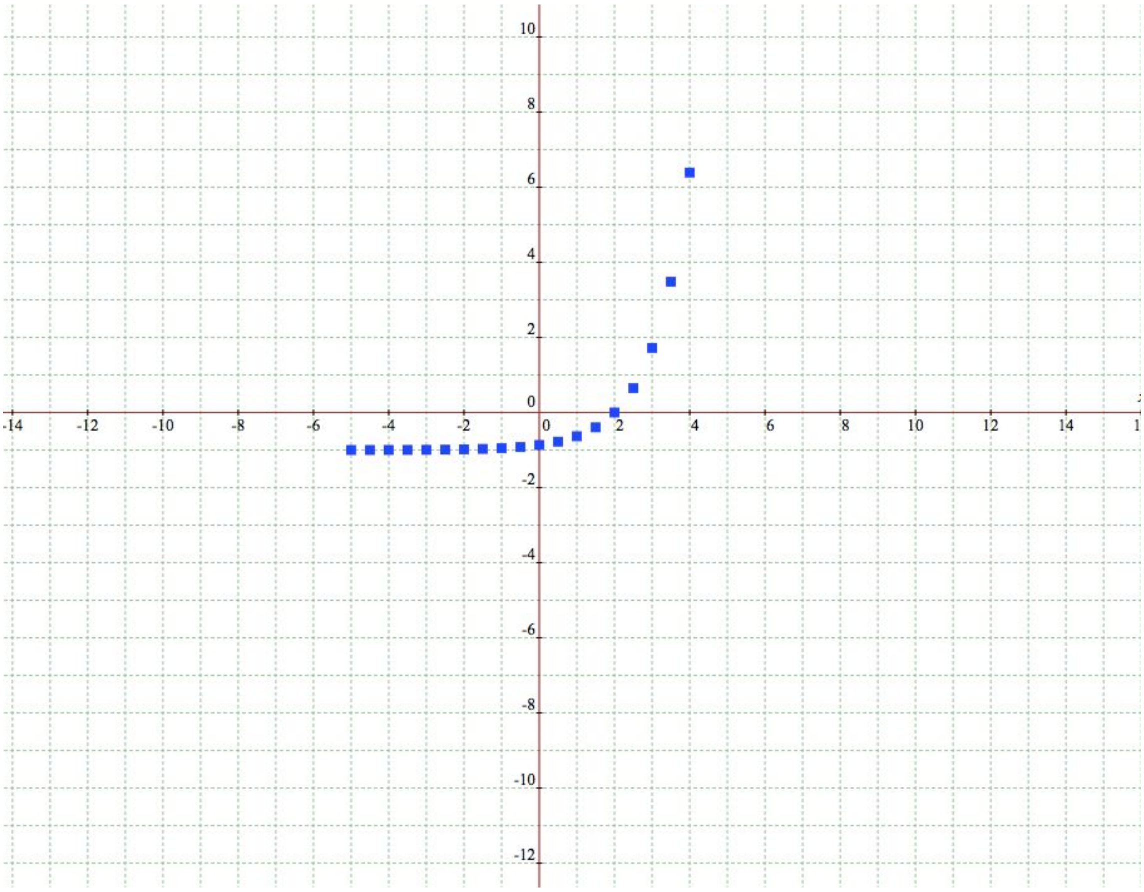


5. G(t)= 0.0002x^4+0.0227x^3+0.1272x^2-0.9181x-1.191
V=.00008x^3+0.0681x^2+.2544x-.9181
A=.0024x^2+.1362x+.2544



6. H(t)= 0.0174x^4 + 0.0866x^3 - 0.0539x^2 - 0.3025x - 0.6989
V=0.0696x^3+0.2598x^2-0.1078x-0.3025

A=0.2088x^2+0.5196x-0.1078



ANALYSIS OF EACH GRAPH

f(t)= In this graph we can observe a hyperbola that is not a continuous graph because it has two different branches. It has two asymptotes, which are vertical and horizontal asymptotes. In this case, the horizontal asymptote is y=0 and the vertical asymptote is x=1, which are points that represent a limit that they will never pass through there.

g(t)= The graph that represent this set of points, is a part of a parabola that grows exponentially in a positive and upwards direction. It passes through the y-axis in y=-4, which is clearly stated in the given formula below the graph.

h(t)= In this graph we can see a linear function, it has an intersection with the axis y in (0,5), and an intersection in x in (-2.5, 0). It has a vertical shift of 5.

F(t)= In this graph we can observe a graph of square root. In this case we have to know the domain before graphing. The domains of the equation are values greater than x=-2

G(t)= This graph shows a line with negative slope (m= -1) that takes a drastic change and converts itself into a positive slope line. It passes through y=-1. In the x-axis, we can observe that the line passes through 2 roots (x=-1 and x=5).

H(t)=This graph shows a line that keeps growing exponentially in a positive way. We can infer that it has a vertical asymptote at x=5, as well as a limit on it. The graph comes from below the x-axis and recovers to a positive way.

CONCLUSIONS

Dante: With this project I learned the types of graphs. I learned how to find the velocity and acceleration of a graph, which can be obtained by solving for the derivative of the original function. Then, for the acceleration, we have to solve for the derivative of velocity, which is the derivative of the original equation.

Abraham: During the elaboration of this project I learned how to find the equation of a graph looking through the key points and substituting correctly in the formulas, as well as improved doing derivatives of an equation.

Humberto: During this partial project, we have been learning the behaviors of each type of graphs by plotting different points and finding its equation. When having an equation, we learned to get derivatives from it, which helped us reach to the acceleration and velocity of each graph. This research made me familiarize with graphmatica, which from my point of view, it's a very useful tool to see how different values and graphs interact.

Miguel: Watching the process of how graphs are formed makes you really understand their behaviour and why they are like that. Before the project I was completely lost on how were the graphs and why they were like that, after making this project is now all clear as water, they actually make sense, and are very similar to the ones seen on physics.

References:
Elert, G. (n.d.). Motion. Retrieved October 10, 2017, from https://physics.info/motion/
(n.d.). Retrieved October 10, 2017, from http://fearofphysics.com/Xva/xva.html