McLennan COMMUNITY COLLEGE

Excel

SIMPSON'S RULE WITH EXCEL

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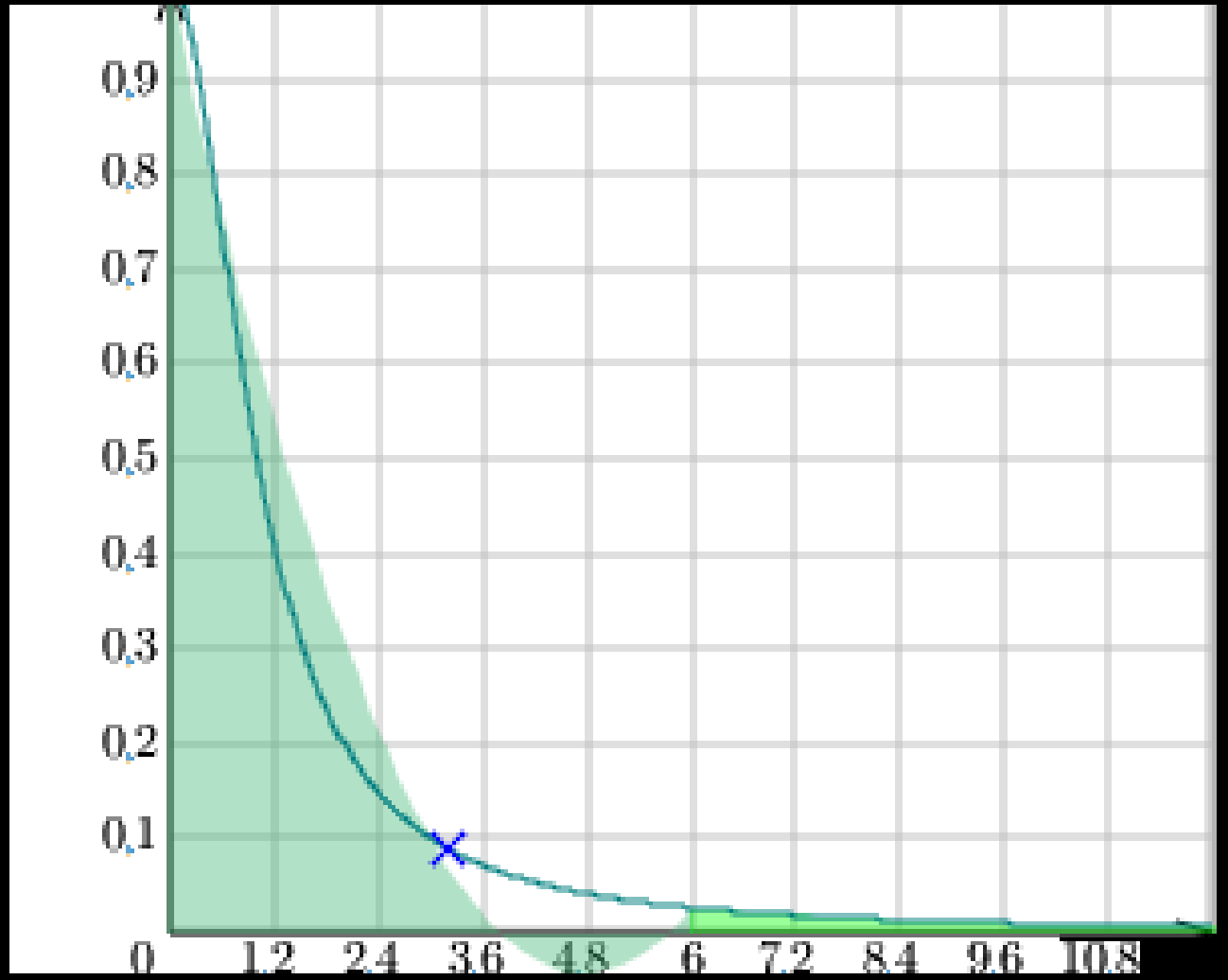
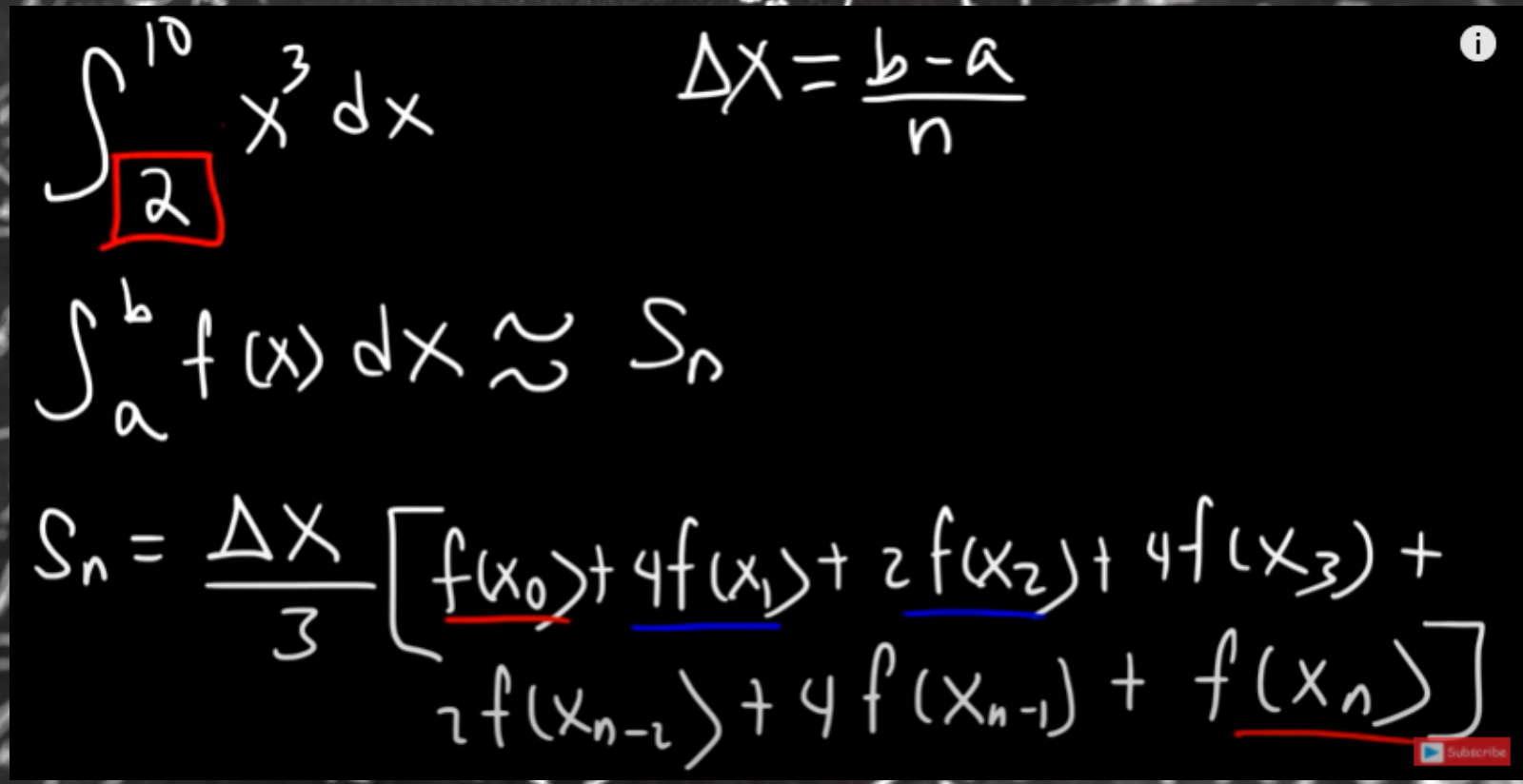
ABSTRACT

- Simpsons rule is a numerical method in calculus.
- It approximates the integral of a function between two limits of ‘a’ and ‘b’.
- It helps find the area under a parabola but above the x axis.



SIMPSON'S RULE FORMULA



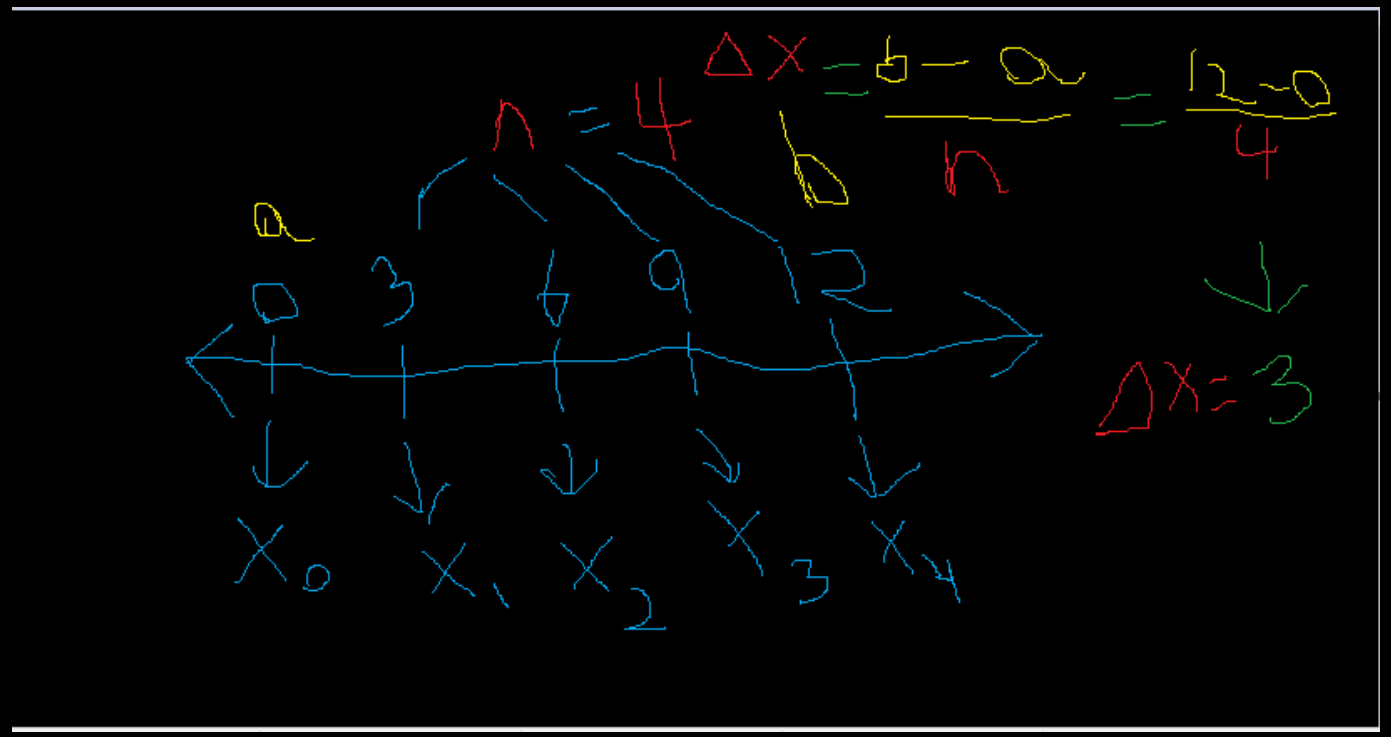
THE INTEGRAL WE ARE EVALUATING

$$\int_0^{12} \frac{1}{(1+x^2)}\,dx$$

DECIDING X VALUES USING N.

In order to decide which values of X we need for our Simpson's rule equation we need to look at the lower limit a and upper limit b values. In our case we will be using zero to twelve with the N(terval) value being four intervals {3, 6, 9, and 12}.

Calculate delta x

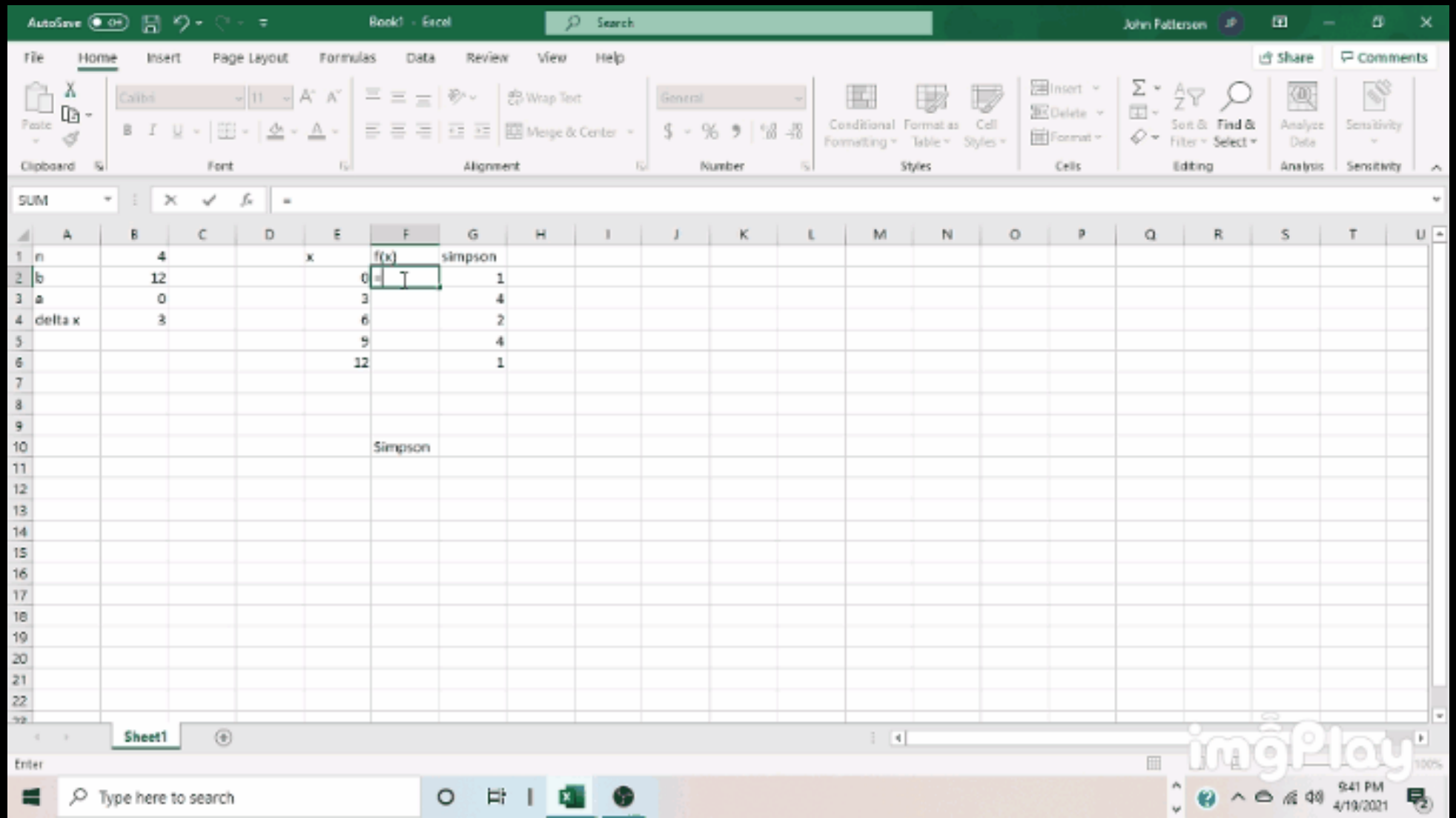


TO CALCULATE THE SIMPSONS RULE IN EXCEL.

- Set up our Excel Sheet similar to the one shown below.
- Separate the formula into parts that are easier to understand.

	A	B	C	D	E	F	G	H	I
1	n	4			x	f(x)	simpson		
2	b	12			0		1		
3	a	0			3		4		
4	delta x	3			6		2		
5					9		4		
6					12		1		
7									
8									
9									
10						Simpson	0		
11									
12									
13									
14									
15									
16									

- Input our equation as shown below 1/(1+x^2).
- Let X = the box that Zero is in.
- In this case that will be E2.



- GRAB THE BLACK DOT ON THE BOTTOM CORNER OF THE BOX AND DRAG DOWN TO AUTOFILL THE EQUATION AND ITS CORRESPONDING BOXES IN THE COLUMN TO THEIR LEFT.

- Let H2 = (F2*G2)
- Then Drag down by the little black dot to fill the values automatically.

Let G10 = B4/3 multiplied by the sum of the values in H2 through H6

- Some of this work is cited Directly from Gail Illich specifically how to do the Simpson's rule on Excel.

- The Organic Chemistry Tutor. "Simpson's Rule & Numerical Integration." *YouTube*, uploaded by The Organic Chemistry Tutor, 13 Mar. 2018, www.youtube.com/watch?v=7EqRRuh-5Lk&t=183s.

- "Numerical Integration Utility." *Zweigmedia*, www.zweigmedia.com/RealWorld/integral/integral.html. Accessed 20 Apr. 2021.

- Gifs were created by me using the IMGPlay app via Android.

- Line Graph was created by me via Microsoft Paint application.