

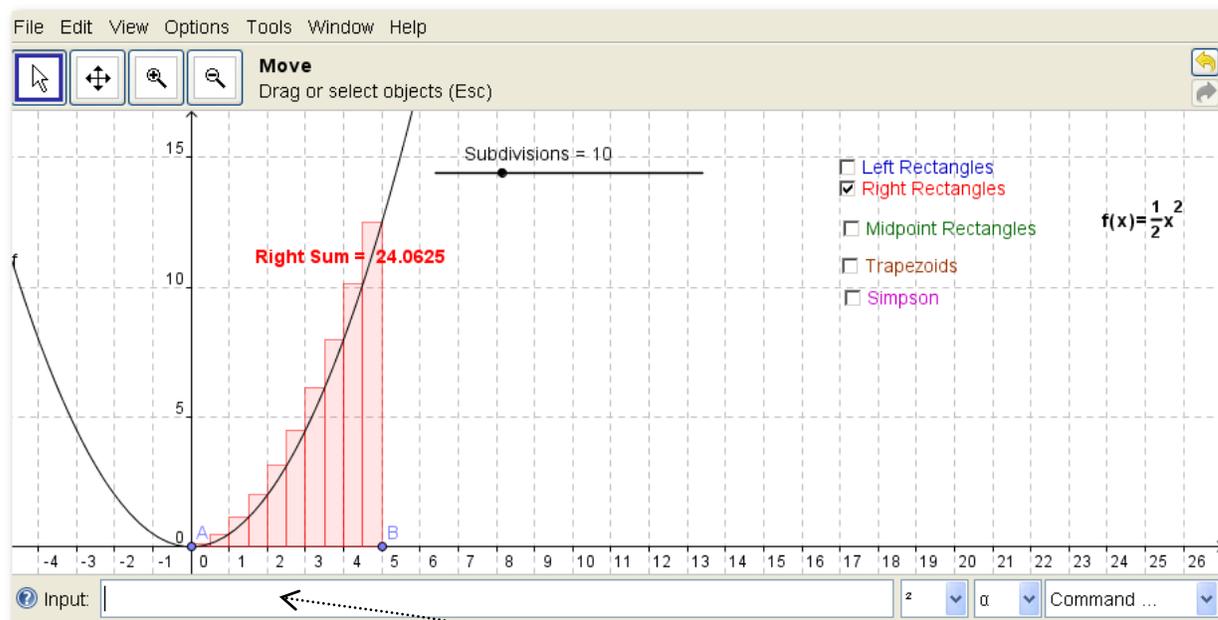
1. Problem Statement:

We will use a Geogebra application which will approximate the area under a curve by using points on the curve as left side of rectangles, right side of rectangles, or trapezoids using both sides.

2. Instructions for Investigation:

If you wish to install Geogebra on your own computer, go to Blackboard/External Links and follow the instructions for downloading and installing. The program is free. Alternatively you may use Geogebra in the computer lab where it is already installed.

Now download and open the file **IntegralApproxl.ggb** from Blackboard/Assignments. Below is a screen shot of what you should expect to see when you open the file. Experiment with the toolbar icons to see what they will do. It is also possible to change the scale of either axis by holding the shift key down and using the mouse to drag a tic mark up/down or right/left.



The function shown is $f(x) = \frac{1}{2}x^2$. You may change the function by entering $f(x) = \dots$ in the input

line at the bottom of the screen. You can also change the limits of the integral by “grabbing” point A or point B and moving them left and right. The slider gives you the option of changing the number of “slices” or subdivisions. Finally, it is possible to use the check boxes to choose which type of figures should be used to calculate the approximation.

The following sheet should be detached and stapled as a cover sheet to your print out one of the functions when you have it finished. The command is **File, Print preview**, then **Print**. Use the Geogebra application to determine the values for the different functions, limits, and types of approximations specified on the cover sheet. Fill in the blanks with the correct values.

Name _____

CPO _____

MATH 1903

Geogebra Assignment

Staple this sheet (as a cover page) to the print out of one of the functions below.

For each of the following set of parameters, write the results in the blank provided. Make sure to reset the left and right limits each time (A must be to the left of B) and to adjust the slider each time.

Function	Left limit	Right limit	Type of Approximation	Subdivisions	Approximation Result
1. $f(x) = \sin(x)$	0	6	Left rectangle	20	_____
2. $f(x) = 2 \cdot 1.05^{-x}$	0	10	Right rectangle	30	_____
3. $f(x) = \ln x$	1	20	Trapezoid	5	_____
4. $f(x) = 0.1 \cdot x^2 + \sin(x)$	-1	1	Midpoint rectangle	40	_____
5. $f(x) = x^3$	-4	4	Simpson	16	_____
6. $f(x) = \frac{10.53}{1+16 \cdot 0.43^x} - .135$	0	10	Right rectangle	40	_____

Print out the contents of the Geogebra screen (for any of the above functions) for submission. Attach it to the back of this page.

Optional Elegance Points:

Elegance points may be obtained ... Change the properties of the slider to go to 100 and print out two of the above problems with the value calculated for 100 subdivisions.