

### Assignment 6

#### *Find Your Sense of Belonging*

To create a sense of belonging at Oregon State I am planning on trying to get involved in research. Research was a big part of my high school life and I would like to continue doing research throughout my academic career. I am looking for any research involving big data and or cybersecurity since those are most likely my options for the applied computer science part. As well, I plan on getting a job which involves programming with my two goal applied options, big data and cybersecurity, this will allow me to get involved in the field earlier and pursue a higher-level job much quicker.

#### *Program Testing*

##### Function 1 Testing

A Point	B Point	Number	Rectangle Approx.	Trapezoidal Approx.	Actual Integral
<b>0</b>	0	5	Error Caught	Error Caught	0
<b>1</b>	5	5	513.6	417.6	1240/3
<b>-5</b>	5	5	900	900	2500/3
<b>4</b>	1	5	-166.799	-211.799	-210
<b>5</b>	10	0	Error Caught	Error Caught	Can't Check
<b>0</b>	5	-5	Error Caught	Error Caught	Can't Check

##### Function 2 Testing

A Point	B Point	Number	Rectangle Approx.	Trapezoidal Approx.	Actual Integral
<b>0</b>	0	5	Error Caught	Error Caught	0
<b>1</b>	5	5	82.72	63.52	188/3
<b>-5</b>	5	5	130	130	250/3
<b>4</b>	1	5	-18.3599	-27.3599	-27
<b>5</b>	10	0	Error Caught	Error Caught	Can't Check
<b>0</b>	5	-5	Error Caught	Error Caught	Can't Check

##### Function 3 Testing

A Point	B Point	Number	Rectangle Approx.	Trapezoidal Approx.	Actual Integral
<b>0</b>	0	5	Error Caught	Error Caught	0
<b>1</b>	5	5	93.6	92	92
<b>-5</b>	5	5	210	200	200

<b>4</b>	1	5	-66.6	-67.5	-67.5
<b>5</b>	10	0	Error Caught	Error Caught	Can't Check
<b>0</b>	5	-5	Error Caught	Error Caught	Can't Check

I created an automated testing file that imported the approximation functions and ran them on random numbers from 0 to 99 with a random number of rectangles or trapezoids. Then I used a library called SciPy which has a built-in integral calculator. I then calculated the percent error by finding the absolute value of the exact integral subtracted from the absolute integral divided by the exact integral to give the percent error. If the percent error is greater than 10%, I find it not to be accurate. This ensures that the mathematics that I am performing behind the scenes to calculate the integral using summation is accurate.