I-U3c

5. Shown below are selected values for a differentiable function f(x). Find the <u>difference</u> in the left and right Riemann approximations of $\int_0^8 f(x) dx$ using the intervals indicated by the table.

x	0	2	3	4	5	7	8
f(x)	3	4	2	4	2	3	2

Here are the intervals indicated by the table, and their differences (Δx)

0 to 2	2
2 to 3	1
3 to 4	1
4 to 5	1
5 to 7	2
7 to 8	1

So those are the 6 bases of our rectangles.

Now you have to find their heights. Well that depends on whether you use the left or right value.

LRAM

From 0-2, we will use 0 because it is the left value. So $\Delta x * f(x)$ in this interval is 2 * f(0) or 2*3 From 2-3 we will use 2 because it is the left value. So $\Delta x * f(x)$ in this interval is 1* f(2) or 1*4 And so on...

From 7-8 we will use 7 because it is the left value. So $\Delta x * f(x)$ in this interval is $1^* f(7)$ or 1^*3

Sum these together to get 23.

RRAM

From 0-2, we will use 2 because it is the right value. So $\Delta x * f(x)$ in this interval is 2 * f(2) or 2*4 From 2-3, we will use 3 because it is the right value. So $\Delta x * f(x)$ in this interval is 1 * f(3) or 1*2 And so on...

From 7-8 we will use 8 because it is the right value. So $\Delta x * f(x)$ in this interval is $1^* f(8)$ or 1^*2

Sum these together to get 24.

The difference between 24 and 23 is 1.