5. Shown below are selected values for a differentiable function $f(x)$. Find the difference in the left and right Riemann approximations of $\int_{0}^{8} f(x) d x$ 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 $(\Delta x)$

| 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 $2 * \mathbf{f}(\mathbf{0})$ 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 $1^{*} \mathbf{f}(2)$ 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 $1^{*} \mathbf{f}(7)$ 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 $2 * \mathbf{f}(\mathbf{2})$ 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 $1 * \mathbf{f}\left(\mathbf{3 )}\right.$ 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 $1^{*} \mathbf{f}(8)$ or $1^{*} 2$

Sum these together to get 24 .

The difference between 24 and 23 is 1 .

