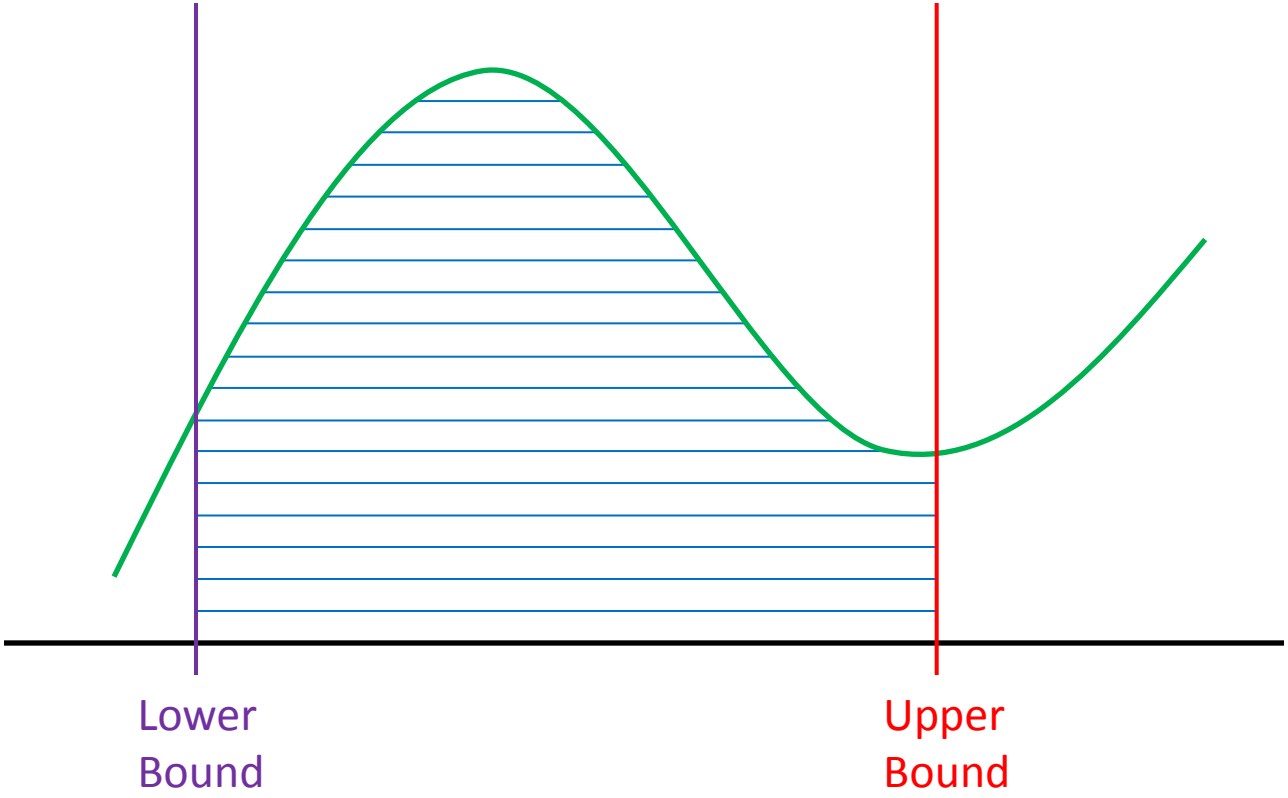
Inlab Supplement

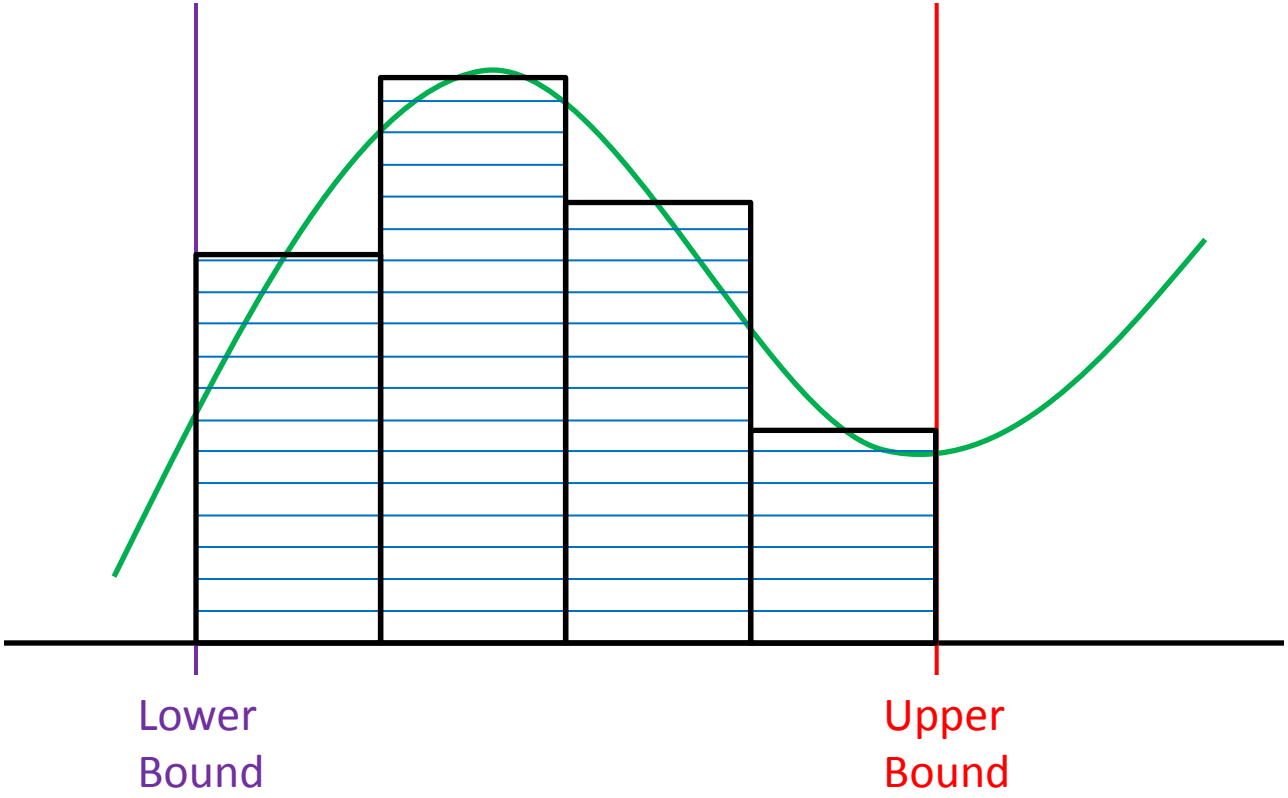
CSCI 111

What is Integration?



Find the area under the curve between two points (lower bound and upper bound).

What is Integration?



We can use rectangles to approximate the area (because it is easy to calculate the area of a rectangle). Then, the area under the curve is *about* the sum of the rectangles' area.

So, How Do We Do That?

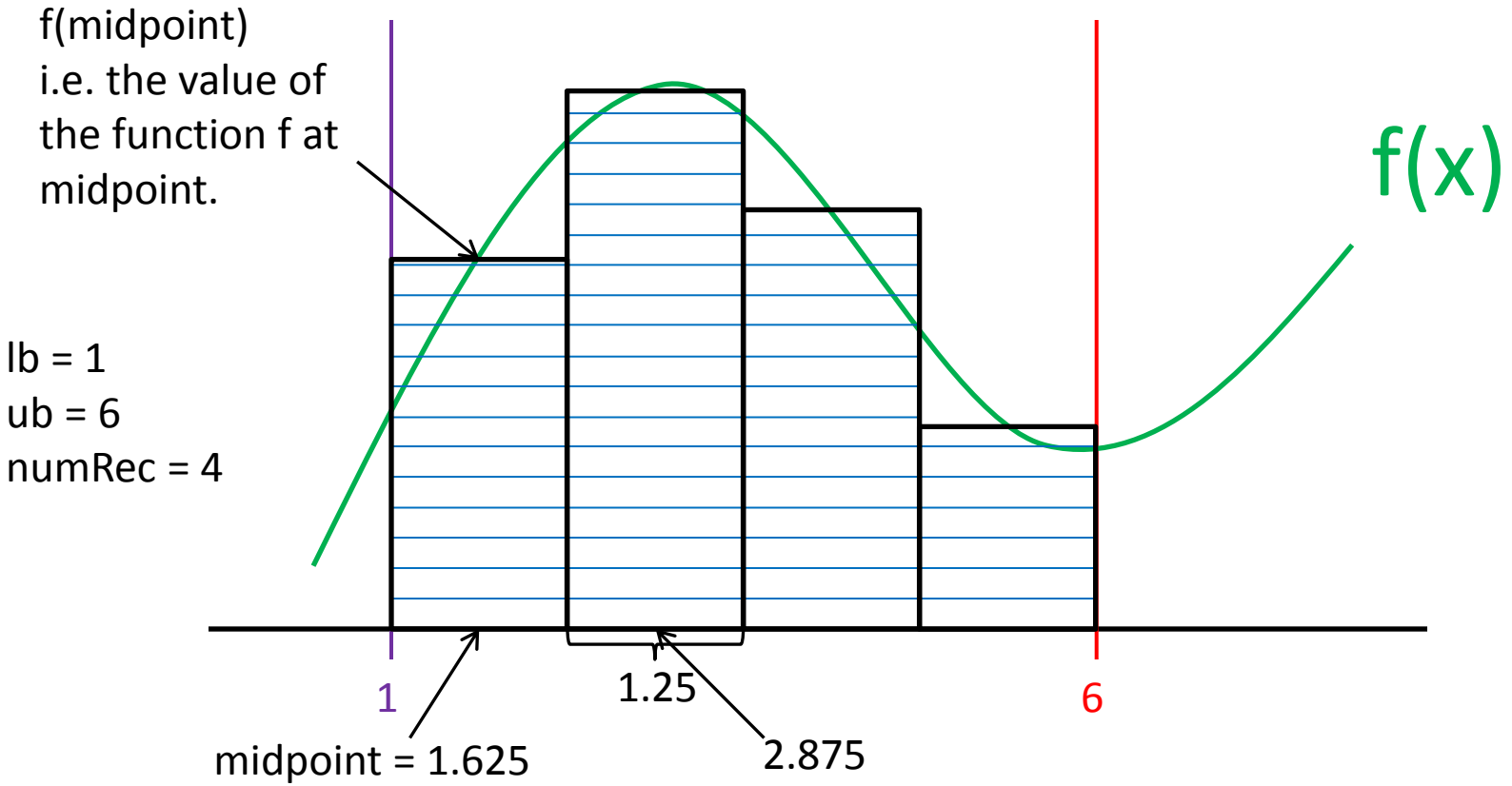
Suppose we have a lower bound (e.g. lb = 0), and upper bound, the number of rectangles we want to use and a function (the curve).

1. Let's assume the width of the rectangles are the same, then from this information we can calculate the width (base) of each rectangle (how?).
2. The midpoint (middle of the base) of the first rectangle is going to be:

   base/2 + lb

3. Then, since the height of the curve at the midpoint is the value of the function at that point, we can easily use that is the rectangle's height and calculate the area of the rectangle (base times height).
4. For the rest of the rectangles, we can update the midpoint to point to the next rectangles midpoint and do Step 3 again (loop).
5. Finally, we have the total area when we are done (so long as the area for each rectangle we calculated was added to an area variable).

Example



1. base = 1.25 for each rectangle.
2. midpoint = 1.625 for the first rectangle.
3. rectangle height = f(midpoint) which means area = ?
4. move midpoint to next rectangle, midpoint = 2.875 (how did I do that?), loop back to 3.