left hand rule

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The *left hand rule* for computing the Riemann integral $\int\limits_a^b f(x)\,dx$ is

$$\int\limits_a^b f(x)\,dx = \lim_{n\to\infty} \sum_{j=1}^{n} f\left(a + (j-1)\left(\frac{b-a}{n}\right)\right)\left(\frac{b-a}{n}\right).$$

If the Riemann integral is considered as a measure of area under a curve, then the expressions $f\left(a + (j-1)\left(\frac{b-a}{n}\right)\right)$ the of the rectangles, and $\frac{b-a}{n}$ is the common of the rectangles.

The Riemann integral can be approximated by using a definite value for n rather than taking a limit. In this case, the partition is $\left\{\left[a, a+\frac{b-a}{n}\right), \ldots, \left[a+\frac{(b-a)(n-1)}{n}, b\right]\right.$ and the function is evaluated at the left endpoints of each of these intervals. Note that this is a special case of a left Riemann sum in which the x_j's are evenly spaced.