### 9.4 Limit of a Riemann Sum

If you wanted to use rectangles to approximate the area under a curve, how many rectangles would be best to use (to be as accurate as possible)?

How wide would each rectangle be?

Consider the following curve:


Let $f$ be continuous on the interval $[a, b]$ which is divided into $n$ subintervals of equal length.
The area under the curve $y=f(x)$ over the interval $[a, b]$ is defined by:

$$
\text { Area }=\lim _{n \rightarrow \infty} \sum_{k=1}^{n} f\left(x_{k}\right) \Delta x, \quad \text { where } \Delta x=\frac{b-a}{n} \text { and } x_{k}=a+k \Delta x
$$

Find the area of the region bounded by $y=16-x^{2}$ and the $x$-axis, for $[1,3]$.

