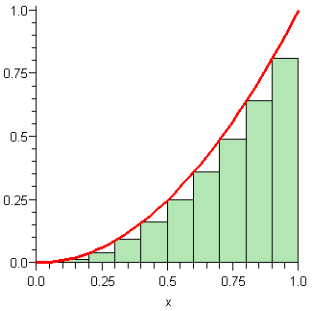
INTEGRATION REVIEW

Let $y = f(x)$ be an integrable function. Then,

$\int_a^b f(x)\,dx = \lim_{\Delta x \to 0} \sum_a^b f(x) \cdot \Delta x$. Also, if $f(x) \geq 0$ on $[a,b]$,

then $\int_a^b f(x)\,dx =$ Area under the curve.



The Fundamental Theorem of Calculus:

If a function *f* is continuous on a closed interval $[a,b]$ and if *F* is any antiderivative of *f* on the interval $[a,b]$, then $\int_a^b f(x)\,dx = F(b) - F(a)$.

Antidifferentiation Rules:

1. Constant Rule: $\int k\,dx = k \cdot x + c$
2. Simple Power Rule: $\int x^n\,dx = \frac{x^{n+1}}{n+1} + c, \; n \neq -1$
3. Natural Log Rule: $\int \frac{1}{x} dx = \ln|x| + c$
4. Natural Exponential Rule: $\int e^x\,dx = e^x + c$
5. e^{ax} Rule: $\int e^{ax}\,dx = \frac{e^{ax}}{a} + c$
6. Exponential Rule: $\int b^x\,dx = \frac{b^x}{\ln b} + c, \; b > 0 \;\&\; b \neq -1$
7. Constant Multiplier Rule: $\int k \cdot f(x)\,dx = k\int f(x)\,dx$
8. Sum Rule: $\int f(x) \pm g(x)\,dx = \int f(x)\,dx \pm \int g(x)\,dx$

Numerical Integration on TI-83/84: **fnInt**(*expression, variable, lower, upper*)