INTEGRAL APPROXIMATIONS ON THE TI-83/84

Recall $\Delta x = \frac{b-a}{n}$, where n is the number of subintervals of (a,b) and a and b are the limits of integration.

LEFT-HAND SUM RULE:

$\sum_{i=0}^{n-1} f(x_i)\Delta x$ $\qquad$ $sum[seq(f(x), x, a, b-\Delta x, \Delta x)*\Delta x]$

$Error(kn) = \frac{1}{k} * Error(n)$

RIGHT-HAND SUM RULE:

$\sum_{i=1}^{n} f(x_i)\Delta x$ $\qquad$ $sum[seq(f(x), x, a+\Delta x, b, \Delta x)*\Delta x]$

$Error(kn) = \frac{1}{k} * Error(n)$

MIDPOINT RULE:

$\sum_{i=1}^{n} f(\frac{x_{i-1}+x_i}{2})\Delta x$ $\qquad$ $sum\left[seq\left(f\left(x+\frac{\Delta x}{2}\right), x, a, b-\Delta x, \Delta x\right)*\Delta x\right]$

OR (easier to use) $\qquad$ $sum\left[seq\left(f(x), x, a+\frac{\Delta x}{2}, b-\frac{\Delta x}{2}, \Delta x\right)*\Delta x\right]$

$Error(kn) = \frac{1}{k^2} * Error(n)$

TRAPEZOID RULE:

$\frac{LEFT(n)+RIGHT(n)}{2}$ $\qquad$ $sum\left[seq\left(\frac{1}{2}[f(x)+f(x+\Delta x)], x, a, b-\Delta x, \Delta x\right)*\Delta x\right]$

$Error(kn) = \frac{1}{k^2} * Error(n)$

SIMPSON'S RULE:

$\frac{2MID(n)+TRAP(n)}{3}$ $\qquad$ $sum\left[seq\left(\frac{1}{3}\left\{2f\left(x+\frac{\Delta x}{2}\right)+\frac{1}{2}(f(x)+f(x+\Delta x))\right\}, x, a, b-\Delta x, \Delta x\right)*\Delta x\right]$

$Error(kn) = \frac{1}{k^4} * Error(n)$