$$\int_a^b f(x)\,dx \;\approx\; \frac{h}{2}\left[f(a) + f(b) + 2\,\sum_{k=1}^{n-1} f(a + kh)\right]$$

Simpson's Rule with even number (n) of subintervals for [*a,b*], each of width *h*:

$$\int_a^b f(x)\,dx \;\approx \frac{h}{3}\left[f(a) + f(b) + 2\,\sum_{r=1}^{n-1} f(a + 2rh) + 4\,\sum_{r=1}^{n} f(a + \{2r - 1\}h)\right]$$

Euler numerical method for the solution of $\frac{dy}{dx} = f(x, y)$ using a step size *h*:

$$y_{n+1} = y_n + h\,f(x_n, y_n)$$

Improved Euler numerical method:

$y_{n+1}^0 = y_n + h\,f(x_n, y_n)$ then

$$y_{n+1} = y_n + \frac{h}{2}\left[f(x_n, y_n) + f^0(x_{n+1}, y_{n+1}^0)\right]$$