	Rule	**Error**	**Exact For**
Midpoint	$\int_{x_i}^{x_{i+1}} f(x)dx \approx hf_{i+1/2}$	$\tau = \frac{1}{24}h^3 f''(\eta)$	$f(x) = 1, x$
Trapezoid	$\int_{x_i}^{x_{i+1}} f(x)dx \approx \frac{h}{2}(f_{i+1} + f_i)$	$\tau = -\frac{1}{12}h^3 f''(\eta)$	$f(x) = 1, x$
Simpson	$\int_{x_{i-1}}^{x_{i+1}} f(x)dx \approx \frac{h}{3}(f_{i-1} + 4f_i + f_{i+1})$	$\tau = -\frac{1}{90}h^5 f''''(\eta)$	$f(x) = 1, x, x^2, x^3$
Boole	$\int_{x_{i-2}}^{x_{i+2}} f(x)dx \approx \frac{2h}{45}(7f_{i-2} + 32f_{i-1} + 12f_i + 32f_{i+1} + 7f_{i+2})$	$\tau = -\frac{8}{945}h^7 f^{(6)}(\eta)$	$f(x) = 1, x, x^2, x^3, x^4, x^5$

Table 1: Summary of integration rules. Note that $h = x_{i+1} - x_i$, $f_i = f(x_i)$, $f_{i+1/2} = f(x_i + \frac{1}{2}h)$.

k	$f(x)$	$\int_{x_i}^{x_{i+1}} f(x)dx$
0	1	h
1	x	$h\left(x_i + \frac{1}{2}h\right)$
2	x^2	$h\left(x_i^2 + hx_i + \frac{1}{3}h^2\right)$
3	x^3	$h\left(x_i^3 + \frac{3}{2}hx_i^2 + h^2x_i + \frac{1}{4}h^3\right)$
4	x^4	$h\left(x_i^4 + 2hx_i^3 + 2h^2x_i^2 + h^3x_i + \frac{1}{5}h^4\right)$
5	x^5	$h\left(x_i^5 + \frac{5}{2}x_i^4h + \frac{10}{3}x_i^3h^2 + \frac{5}{2}x_i^2h^3 + x_ih^4 + \frac{1}{6}h^5\right)$

Table 2: Values of $\int_{x_i}^{x_{i+1}} x^k dx$ for various values of k.