

Chapter 19

Applications of Integration



Table 19-1: Solution to Example 1(b)

	y_0	y_1	y_2	y_3	y_4
x	-3	-2	-1	0	1
$f(x)$	6.002	4.018	2.135	1.000	5.389

Table 19-2: Solution to Example 1(c)

	y_0	y_1	y_2	y_3	y_4	y_5	y_6	y_7	y_8
x	-3	-2.5	-2	-1.5	-1	-0.5	0	0.5	1
$f(x)$	6.002	5.007	4.018	3.050	2.135	1.368	1.000	1.718	5.389

Table 19-3: Solution to Example 2(a)

	y_0	y_1	y_2	y_3	y_4	y_5
x	-2	-1.2	-0.4	0.4	1.2	2
$f(x)$	0.040	0.145	0.525	1.904	6.899	25.000

Table 19-4: Solution to Example 2(b)

	y_0	y_1	y_2	y_3	y_4	y_5
x	1	1.4	1.8	2.2	2.6	3
$f(x)$	0.333	0.368	0.391	0.407	0.419	0.429

Table 19-5: Solution to Example 3(b)

	y_0	y_1	y_2	y_3	y_4
x	-3	-2	-1	0	1
$f(x)$	6.002	4.018	2.135	1.000	5.389

Table 19-6: Solution to Example 3(c)

	y_0	y_1	y_2	y_3	y_4	y_5	y_6	y_7	y_8
x	-3	-2.5	-2	-1.5	-1	-0.5	0	0.5	1
$f(x)$	6.002	5.007	4.018	3.050	2.135	1.368	1.000	1.718	5.389

Table 19-7: Solution to Example 3(d)

Method	$n = 4$	$n = 8$
Exact	11.69	11.69
Trapezium	12.85	12.00
Simpson	11.91	11.71

Table 19-8: Solution to Example 4(a)

	y_0	y_1	y_2	y_3	y_4	y_5	y_6
θ	0	$\pi/12$	$\pi/6$	$\pi/4$	$\pi/3$	$5\pi/12$	$\pi/2$
$f(\theta)$	0	0.5	$\sqrt{3}/2$	1	$\sqrt{3}/2$	0.5	0

Table 19-9: Solution to Example 4(b)

	y_0	y_1	y_2	y_3	y_4	y_5	y_6
θ	$-\pi/6$	$-\pi/9$	$-\pi/18$	0	$\pi/18$	$\pi/9$	$\pi/6$
$f(\theta)$	1.3333	1.1325	1.0311	1.0000	1.0311	1.1325	1.3333
	1.3333	1.1325	1.0311	1.0000	1.0311	1.1325	1.3333

Table 19-10: Solution to Example 5(b) – Part I

	y_0	y_1	y_2
x	1	2	3
$f(x)$	1.3333	1.3333	1.0909

Table 19-11: Solution to Example 5(b) – Part II

	y_0	y_1	y_2	y_3
x	1	$5/3$	$7/3$	3
$f(x)$	1.3333	1.3953	1.2537	1.0909

Table 19-12: Solution to Example 5(b) – Part III

	y_0	y_1	y_2	y_3	y_4
x	1	1.5	2	2.5	3
$f(x)$	1.3333	1.4118	1.3333	1.2121	1.0909

Table 19-13: Solution to Example 5(b) – Part IV

	y_0	y_1	y_2	y_3	y_4	y_5
x	1	$\frac{7}{5}$	$\frac{9}{5}$	$\frac{11}{5}$	$\frac{13}{5}$	3
$f(x)$	1.3333	1.4141	1.3740	1.2865	1.1872	1.0909

Table 19-14: Solution to Example 5(b) – Part V

	y_0	y_1	y_2	y_3	y_4	y_5	y_6	y_7	y_8	y_9	y_{10}
x	1	1.2	1.4	1.6	1.8	2	2.2	2.4	2.6	2.8	3
$f(x)$	1.3333	1.3953	1.4141	1.4035	1.3740	1.3333	1.2865	1.2371	1.1872	1.1382	1.0909

Table 19-15: Solution to Example 5(c)

n	Estimate Value	Exact Value	Absolute Error	Outcome
2	2.545	2.599	0.054	Underestimate
3	2.574	2.599	0.025	Underestimate
4	2.585	2.599	0.014	Underestimate
5	2.590	2.599	0.009	Underestimate
10	2.596	2.599	0.003	Underestimate

Table 19-16: Solution to Example 5(d)

n	Estimate Value	Exact Value	Relative Percentage Error
2	2.545	2.599	2.078 %
3	2.574	2.599	0.962 %
4	2.585	2.599	0.539 %
5	2.590	2.599	0.346 %
10	2.596	2.599	0.115 %



Thank You

