TABLE 2.1 Chi-Square Values

	X_T			X_T	
K	5%	1%	K	5%	1%
1	3.84	6.63	15	25.00	30.58
2	5.99	9.21	16	26.30	32.00
3	7.81	11.34	17	27.59	33.41
4	9.49	13.28	18	28.87	34.81
5	11.07	75.09	19	30.14	36.19
6	12.59	16.81	20	31.41	37.57
7	14.07	18.48	22	33.90	40.30
8	15.51	20.09	24	36.40	43.00
9	16.92	21.67	25	37.65	44.31
10	18.31	23.21	26	38.90	45.60
11	19.68	24.73	28	41.30	48.30
12	21.03	26.22	30	43.80	50.90
13	22.36	27.69	40	55.80	63.70
14	23.68	29.14	50	67.50	76.20

EXAMPLE 2.11

Table 2.2 contains a set of numbers (100) given. Conduct a chi-square test to determine if these numbers are uniform in the range (0, 1).

TABLE 2.2 A Set of 100 Numbers

0.95	0.23	0.61	0.49	0.89	0.76	0.46	0.02	0.82	0.44
0.62	0.79	0.92	0.74	0.18	0.41	0.94	0.92	0.41	0.89
0.06	0.35	0.81	0.01	0.14	0.20	0.20	0.60	0.27	0.20
0.02	0.75	0.45	0.93	0.47	0.42	0.85	0.53	0.20	0.67
0.84	0.02	0.68	0.38	0.83	0.50	0.71	0.43	0.30	0.19
0.19	0.68	0.30	0.54	0.15	0.70	0.38	0.86	0.85	0.59
0.50	0.90	0.82	0.64	0.82	0.66	0.34	0.29	0.34	0.53
0.73	0.31	0.84	0.57	0.37	0.70	0.55	0.44	0.69	0.62
0.79	0.96	0.52	0.88	0.17	0.98	0.27	0.25	0.88	0.74
0.14	0.01	0.89	0.20	0.30	0.66	0.28	0.47	0.06	0.99

Let us pick a bin number of 10. If we now count the numbers in the bins (0 to 0.1, 0.1 to 0.2, etc.), bin 1 contains seven numbers, bin 2 contains seven numbers, and so on. If the numbers are uniformly distributed, $p_i = 0.1$. Hence $Np_i = 100 \times 0.1$. Note that for a uniform distribution, all the p_i are equal.

Therefore,

$$\chi^2 = \frac{(7-10)^2}{10} + \frac{(7-10)^2}{10} + \frac{(11-10)^2}{10} + \frac{(10-10)^2}{10} + \frac{(11-10)^2}{10} + \frac{(9-10)^2}{10} + \frac{(11-10)^2}{10} + \frac{(10-10)^2}{10} + \frac{(15-10)^2}{10} + \frac{(9-10)^2}{10} = 4.8. \tag{2.79}$$

From Table 2.1, $X_T(K-1) = X_T(9) = 16.92$ for $\alpha = 5\%$, which is obviously larger than the χ^2 value of 4.8 in this case. Therefore, the hypothesis that the numbers are uniform is accepted. ■