

**Chapter 6**

**13-1.** The following frequency distribution shows the number of times an outcome was observed from the toss of a die. Based on the frequencies that were observed from 2,400 tosses of the die, can it be concluded at the 0.05 level of significance that the die is fair?

Outcome	Frequency
1	352
2	418
3	434
4	480
5	341
6	375

**13-2.** Based on the sample data in the following frequency distribution, conduct a test to determine whether the population from which the sample data were selected is Poisson distributed with mean equal to 6. Test using  $\alpha = 0.05$ .

$x$	Frequency	$x$	Frequency
2 or less	7	9	53
3	29	10	35
4	26	11	28
5	52	12	18
6	77	13	13
7	77	<u>14 or more</u>	<u>13</u>
8	72	Total	500

**13-3.** A large retailer receives shipments of batteries for consumer electronic products in packages of 50 batteries. The packages are held at a distribution center and are shipped to retail stores as requested. Because some packages may contain defective batteries, the retailer randomly samples 400 packages from its distribution center and tests to determine whether the batteries are defective or not. The most recent sample of 400 packages revealed the following observed frequencies for defective batteries per package:

# of Defective Batteries per Package	Frequency of Occurrence
0	165
1	133
2	65
3	28
4 or more	9

The retailer's managers would like to know if they can evaluate this sampling plan using a binomial distribution with  $n = 50$  and  $p = 0.02$ . Test at the  $\alpha = 0.01$  level of significance.

**13-9.** The Baltimore Steel and Pipe Company recently developed a new pipe product for a customer. According to specifications, the pipe is supposed to have an average outside diameter of 2.00 inches with a standard deviation equal to 0.10 inch, and the distribution of outside diameters is to be normally distributed. Before going into full-scale production, the company selected a random sample of 30 sections of pipe from the initial test run. The following data were recorded:

Pipe Section	Diameter (inches)	Pipe Section	Diameter (inches)
1	2.04	16	1.96
2	2.13	17	1.89
3	2.07	18	1.99
4	1.99	19	2.13
5	1.90	20	1.90
6	2.06	21	1.91
7	2.19	22	1.95
8	2.01	23	2.18
9	2.05	24	1.94
10	1.98	25	1.93
11	1.95	26	2.08
12	1.90	27	1.82
13	2.10	28	1.94
14	2.02	29	1.96
15	2.11	30	1.81

- Using a significance level of 0.01, perform the appropriate test.
- Based on these data, should the company conclude that it is meeting the product specifications? Explain your reasoning.

**13-16.** Utilize the following contingency table to answer the questions listed below.

	$C_1$	$C_2$
$R_1$	51	207
$R_2$	146	185
$R_3$	240	157

- State the relevant null and alternative hypotheses.
- Calculate the expected values for each of the cells.
- Compute the chi-square test statistic for the hypothesis test.
- Determine the appropriate critical value and reach a decision for the hypothesis test. Use a significance level of 0.05.
- Obtain the  $p$ -value for this hypothesis test.

**13-21.** An instructor in a large accounting class is interested in determining whether the grades that students get are related to how close to the front of the room the students sit. He has categorized the room seating as “Front,” “Middle,” and “Back.” The following data were collected over two sections with 400 total students. Based on the sample data, can you conclude that there is a dependency relationship between seating location and grade using a significance level equal to 0.05?

	A	B	C	D	F	Total
Front	18	55	30	3	0	106
Middle	7	42	95	11	1	156
Back	3	15	104	14	2	138
Total	28	112	229	28	3	400

**13-22.** The following table classifies a stock's price change as up, down, or no change for both today's and yesterday's prices. Price changes were examined for 100 days. A financial theory states that stock prices follow what is called a "random walk." This means, in part, that the price change today for a stock must be independent of yesterday's price change. Test the hypothesis that daily stock price changes for this stock are independent. Let  $\alpha = 0.05$ .

<b>Price Change Today</b>	<b>Price Change Previous Day</b>		
	<b>Up</b>	<b>No Change</b>	<b>Down</b>
<b>Up</b>	14	16	12
<b>No Change</b>	6	8	6
<b>Down</b>	16	14	8