8.6-1. Let the total lengths of the male and female trident lynx spiders be denoted by X and Y, respectively, with corresponding distribution functions $F(x)$ and $G(y)$. Measurement of the lengths, in millimeters, of eight male and eight female spiders yielded the following observations of X and Y:

X:	5.40	5.55	6.00	5.00	5.70	5.20	5.45	4.95
Y:	6.20	6.25	5.75	5.85	6.55	6.05	5.50	6.65

(a) Use these data to test the hypothesis $H_0: F(z) = G(z)$ against the alternative $H_1: F(z) > G(z)$. Let $\alpha \approx 0.10$, and use a run test.

(b) Use the two-sample Wilcoxon test to test H_0: $m_X = m_Y$ against the alternative H_1: $m_X < m_Y$ with $\alpha \approx 0.10$.

8.6-9. A manufacturer of powdered soap checks the weights of soap in the company's 6-pound boxes periodically throughout the day. At each of 22 times, four boxes are selected at random, and the average of the weights of the soap in the boxes is recorded. Use the following 22 average weights to test the hypothesis of randomness against the alternative hypothesis of a trend at an approximate significance level of $\alpha = 0.025$:

6.050	6.038	6.003	6.015	6.025	6.063	6.033	6.010
5.995	6.020	6.060	6.060	6.065	6.050	6.043	6.040
6.045	6.065	6.055	6.060	6.060	6.070		

9.1-3. In the Michigan Lottery Daily3 Game, twice a day a three-digit integer is generated one digit at a time. Let p_i denote the probability of generating digit i, $i = 0, 1, \ldots, 9$. Let $\alpha = 0.05$, and use the following 50 digits to test H_0: $p_0 = p_1 = \cdots = p_9 = 1/10$:

1	6	9	9	3	8	5	0	6	7
4	7	5	9	4	6	5	6	4	4
4	8	0	9	3	2	1	5	4	5
7	3	2	1	4	6	7	1	3	4
4	8	8	6	1	6	1	2	8	8

9.1-7. A rare type of heredity change causes the bacterium in *E. coli* to become resistant to the drug streptomycin. This type of change, called *mutation*, can be detected by plating many bacteria on petri dishes containing an antibiotic medium. Any colonies that grow on this medium result from a single mutant cell. A sample of $n = 150$ petri dishes of streptomycin agar were each plated with 10^6 bacteria, and the numbers of colonies were counted on each dish. The observed results were that 92 dishes had 0 colonies, 46 had 1, 8 had 2, 3 had 3, and 1 dish had 4 colonies. Let X equal the number of colonies per dish. Test the hypothesis that X has a Poisson distribution. Use $\overline{x} = 0.5$ as an estimate of λ. Let $\alpha = 0.01$.

9.2-3. Each of two comparable classes of 15 students responded to two different methods of instructions, giving the following scores on a standardized test:

Class U:	91	42	39	62	55	82	67	44
	51	77	61	52	76	41	59	
Class V:	80	71	55	67	61	93	49	78
	57	88	79	81	63	51	75	

Use a chi-square test with $\alpha = 0.05$ to test the equality of the distributions of test scores by dividing the combined sample into three equal parts (low, middle, high).

9.2-9. A survey of high school girls classified them by two attributes: whether or not they participated in sports and whether or not they had one or more older brothers. Use the following data to test the null hypothesis that these two attributes of classification are independent:

	Participated in Sports		
Older Brother(s)	Yes	No	Totals
Yes	12	8	20
No	13	27	40
Totals	25	35	60

Approximate the p-value of this test. Do we reject the null hypothesis if $\alpha = 0.05$?