Questions 4–7 refer to the following set of data:

A group of AP Statistics students wanted to see if plain, peanut, and almond M&M's have the same color distribution. To test this, students took a random sample of each type of M&M and classified the candies in the sample by color. They plan to carry out a chi-square test to decide if there is evidence that the color distributions are not the same for the three types of M&M's. A total of 207 M&M's were classified.

	Red	Blue	Yellow	Green	Orange	Brown
Plain	20	18	15	10	14	12
Peanut	8	6	8	25	5	7
Almond	7	11	10	12	10	9

2. A recent study reported that in a random sample of 248 women, 58 had changed their political affiliation since the last election. It also reported that 120 in a random sample of 387 men had changed political affiliation. The researchers would like to know if these data provide convincing evidence that the proportion changing political affiliation is greater for men than for women.
    (a) State the hypotheses of interest.
    (b) Identify the appropriate test and verify the conditions that must be met.
    (c) Is there convincing evidence that the proportion changing political affiliation is greater for men than for women? Use a significance level of 0.05.

FREE-RESPONSE PROBLEMS

1. Two types of fertilizer for roses are being considered by a housing community for their landscaping needs. The community decided to test the fertilizer on 170 bushes to see if one yielded more rose growth than the other. Each rose bush was assigned at random to one of the two fertilizers. The average growth, in centimeters, for each fertilizer was recorded. Fertilizer A is less expensive and will be used unless there is convincing evidence that mean growth is greater for Fertilizer B. Carry out an appropriate hypothesis test using $\alpha = 0.05$, and make a recommendation as to which fertilizer should be used.

Fertilizer	Sample Size	Mean Growth (cm)	Standard Deviation
Type A	87	12.7	1.5
Type B	83	13.3	2.2

15. Using the data in the table above, the value of the chi-square statistic is 5.66. Which of the following is a correct statement about the P-value for this test?
(A) P-value > 0.10
(B) $0.05 < P$-value < 0.10
(C) $0.01 < P$-value < 0.05
(D) $0.001 < P$-value < 0.01
(E) P-value < 0.001

FREE-RESPONSE PROBLEMS

1. Regina is worried that the color of her new cardigan will attract the attention of killer bees in southern California where she is going to hike. To settle her nerves she looks at the American Killer Bee Association website. It shows that these bees are highly agitated by various colors. They have found that 75% of bees are agitated by green, 9% by blue, 6% by purple or pink, and the remaining 10% by other colors.
   (a) In a random sample of 200 killer bees, how many would you expect to be agitated by each color?
   (b) A recent study of 120 randomly selected people stung by killer bees last year found the individuals were wearing the colors shown in the table below. Do these data provide convincing evidence that the color distribution of colors worn by people stung by killer bees is different from the percentages given on the web site?

Color Worn By Individual Stung By Killer Bees

Green	Blue	Purple/Pink	Other
86	21	6	7

2. A restaurant offers both dine-in and take-out service. Customers can pay for their meal in cash, by credit card, or by debit card. The restaurant owner wonders if there is an association between the method of payment and the type of service. To investigate, a random sample is selected from the orders placed during the last year and the method of payment and the type of service is recorded for each of these orders. The data is summarized in the table below.

	Cash	Credit	Debit
Dine-in	34	122	32
Take-out	70	95	47

   (a) Should the restaurant owner carry out a test of homogeneity or a test of independence to answer his question?

   (b) Carry out a test to answer the question of interest to the owner. Use a significance level of 0.05 for your test.