

## Stat 1040 Recitation packet 13

1. On the M&M web page, it claims that they produce 13% brown, 14% yellow, 13% red, 24% blue, 20% orange, and 16% green milk chocolate M&M's. Suppose we buy a bag of milk chocolate M&M's and come up with the following numbers of each color:

Color	Number
brown	50
yellow	47
red	41
blue	94
orange	102
green	47
	381

Test the hypothesis that our bag of M&M's is like a simple random sample of M&M's from a population with the specified percentages of each color. You must state a null and an alternative hypothesis, find a test statistic and a P-value and clearly state your conclusions in terms of what you have learned about the color of milk chocolate M&M's.

2. In a large city, there are 5 electoral precincts. There are two mayoral candidates, A and B. A political science student takes a simple random sample of 1870 voters from this city and asks them which precinct they live in and whether they voted for candidate A or B. She makes the following table:

Precinct	Candidate		Total
	A	B	
1	400	229	629
2	184	154	338
3	101	200	301
4	182	186	368
5	136	98	234
Total	1003	867	1870

We want to test the hypothesis that voting for mayoral candidates A and B is independent of precinct for voters from this city.

- (a) Clearly state the null and the alternative hypotheses.
  - (b) Compute a test statistic.
  - (c) Find the degrees of freedom.
  - (d) What can you say about the P-value?
  - (e) Do you reject the null hypothesis? Explain why or why not.
  - (f) Clearly state your conclusions.
3. The average age of all 43 presidents when they entered office is 55.3 years, and the SD is 6.2 years. Explain why it would be inappropriate to use these numbers to conduct a significance test on the hypothesis that the average age of entering presidents is 50 years.

4. In a study on snoring and nightmares, researchers found the following results:

	Frequency of nightmares				Total
	Never	Seldom	Occasionally	Frequently	
Nonsnorers	22	45	35	11	113
Snorers	16	31	27	12	86
Total	38	76	62	23	199

Assuming this is a random sample of people, is there evidence that the frequency of nightmares (never, seldom, occasionally, frequently) is different for snorers and nonsnorers? You must clearly state a null and alternative hypothesis, compute a test statistic and a P-value and state your conclusions.

5. Three psychiatrists set out to identify observed characteristics that distinguish schizophrenic patients from nonschizophrenic ones. They considered 77 different characteristics, and did 77 two-sample z-tests. Two of the tests turned up statistically significant at the 5% level (i.e. the P-value was less than 5%). Explain why this is not convincing evidence that these two characteristics are useful for identifying schizophrenic patients. What should the investigators do next to help decide whether or not these characteristics should be used for this purpose?