

Stat/Math 415 Final Exam Practice Problems

The exam covers Chap 5.1~5.6, Chap 6.4~6.5, Chap 7.1~7.4, 7.6, Chap 8.1~8.4, Chap 9.1~9.3.

Please carefully review the practice and exam questions for Midterm 1 and 2. Additional practice questions are as follows.

1. A company wants to determine whether the mean time required to complete a certain task differs among three levels of employee training. The company randomly selected 10 employees from each training level (Beginner, Intermediate, and Advanced), and data are summarized below:

Training Level	n	\bar{X}	S^2
Advanced	10	24.2	21.54
Intermediate	10	27.1	18.64
Beginner	10	30.2	17.76

Specify the appropriate null and alternative hypotheses, and use ANOVA to test your hypotheses at the 0.05 significance level. You should complete the ANOVA table below.

Source	S.S.	d.f.	M.S.	F-ratio
Treatment				
Error				
Total				

2. A brand of toy is sold in 5 types denoted by A_1, A_2, A_3, A_4 , and A_5 . Let p_i be the probability that a randomly chosen toy is of type A_i , $i = 1, 2, 3, 4, 5$. At $\alpha = 0.01$, we wish to test $H_0: p_1 = 0.4, p_2 = 0.2, p_3 = 0.2, p_4 = 0.1, p_5 = 0.1$ against $H_1: H_0$ is not valid, using a random sample of $n = 580$ toys whose types yielded the frequencies, $A_1: 224, A_2: 119, A_3: 130, A_4: 48$, and $A_5: 59$.
3. A random sample of $n = 429$ people were classified according to sex and according to whether they viewed the newspaper, television or radio as the most credible of all public media. The data are as follows:

	Newspaper	Television	Radio	Total
Male	92	108	19	
Female	97	81	32	
Total				

Use the chi-square statistic to test the hypothesis, at the 5% level of significance, that the variables "media credibility" and "sex" are independent, and provide the p-value of the test.

4. To compare the lifetimes of a type of light bulb made in two different factories, A and B, we test independent random samples of 10 bulbs from each factory. The data, in hundreds of hours, are:

A : 5.6 4.6 6.8 4.9 6.1 5.3 4.5 5.8 5.4 4.7

B : 7.2 8.1 5.1 7.3 6.9 7.8 5.9 6.7 6.5 7.1

- (a) We wish to test $H_0 : m_A = m_B$ vs. $H_1 : m_A \neq m_B$. Use the sign test to write down a critical region with level of significance 5%, approximately, and carry out the test and state your conclusion.
- (b) We wish to test $H_0 : m_A = m_B$ vs. $H_1 : m_A \neq m_B$. Use the Wilcoxon statistic to write down a critical region with level of significance 5%, approximately, and carry out the test and state your conclusion.
- (c) Use t-test for $H_0 : \mu_A = \mu_B$ vs. $H_1 : \mu_A \neq \mu_B$ with significance level 5%.