Doç.Dr.Çiğdem Arıcıgil Çilan 2011-2012 Spring Semester Statistical Analysis – 11th Week Tutorial

2 May 2012 Wednesday

Test of More Than Two Population Proportions and Test of Variances (One, Two and More Than Two)

1) Mobile phone market is shared between 5 companies with market shares of 30%, 20%, 25%, 15% and 10%. In order to see if there is a significant change in the market shares, 600 mobile phone users were chosen randomly and among those 225 said that they are using the 1st brand, 130 of them the 2nd brand, 140 of them the 3rd brand, 60 of them the 4th brand and 45 of them said that they are using the 5th brand. At 5% significance level is there any difference in the market shares?
2) It is known that in a company in 2002, 45% of the workers had a primary school degree, 35% had a secondary school degree, 20% left high school without finishing. In order to see if there was any significant change in the education levels of the workers in the company in 10 years time, 150 workers were chosen randomly and it is found that 70 of them has a primary school degree, 60 of them has a secondary school degree and 20 of them has left high school without finishing. See if there is any change at a 5% significance level.
3) 20 workers were chosen randomly in order to test the effectiveness of a new production method on reducing the standard deviation of the labour productivity in a large company which was 12 units. The standard deviation of the sample is found to be 10. Could it be concluded that the new production technique is effective at a 5% significance level?
4) It is claimed that a new production process will reduce the standard deviation of the weights of the products which was 15 grams. 17 products were chosen randomly from the trial production process and their standard deviation of weights are found as 11 grams. Is the claim valid at a 5% significance level?
5) The quality control manager of a big company has asked you to determine if the variance of the strength of steels they produce is within the established standard. This standard states that the variance of the steels cannot exceed 2209. 30 steels from the production line are chosen randomly and their strength levels are recorded as follows. At a 5% significance level would you be able to conclude that the production is within the standards?

	207	294	312	299	285	301	226	245	309	317	281	308	278	305	280
Strength	292	260	272	318	312	310	293	292	242	282	294	312	214	265	258

6) A company is applying two different tests during their job recruitment process. In order to see if there is any difference between the standard deviations of the two tests, the scores of 22 candidates from the first test and the scores of 25 candidates from the second test were chosen randomly and their scores were observed as follows. At a 5% significance level is there any difference between the standard deviations of these two tests?

1st Test	25	35	50	49	25	32	36	45	46	48	42	47	39	38	40	37	32	38	39	40	45	46			
2nd Test	39	32	50	32	40	14	23	25	44	48	7	25	35	45	24	48	22	43	21	42	8	48	12	35	28

7) In order to test if there is any difference between the standard deviations of labour productivity of workers from two different branches of a company, 11 workers from the first branch and 25 workers from the second branch were chosen randomly and the following results were obtained. Could it be said that there is a difference between the standard deviations of the labour productivities of the workers at a 5% significance level?

1. Branch	21	22	35	38	42	33	23	40	26	45	38													
2. Branch	38	48	42	35	21	17	35	36	48	15	32	12	43	40	36	30	11	35	22	19	41	39	41	49	27

8) A company buys materials from three different suppliers in 500 batches. 6 batches were chosen randomly and the number of unstandard materials were recorded in each batch as follows. Examine if there is any significant difference between the standard deviations of the number of unstandard materials of the three suppliers. (Newbold, P: (1995) İşletme ve İktisat için İstatistik çeviri kitabı, s.687 soru.3)

Supplier A	Supplier B	Supplier C
28	22	33
37	27	29
34	29	39
29	20	33
31	18	37
33	30	38