

THE UNIVERSITY OF ZAMBIA

SCHOOL OF HUMANITIES AND SOCIAL SCIENCES

DEM 2414: RESEARCH AND STATISTICAL METHODS IN DEMOGRAPHY

TUTORIAL EXERCISE NO. 3

1. A dispute has arisen between UNZA management and UNZAWU. Management claims that the workers earn more than K7.5 per hour on an 8 – hour day (K60 per day, K300 per week, and K1,200 per month), a claim the workers dispute. A labour consultant carries out research on a random sample of 100 workers and finds that the average earnings per hour is K7.9 per hour with a standard deviation of K1.5. Is the management's claim true? Use 5% level of significance.
2. The Dean of Student informs the Vice Chancellor that more than 50% of the students at the University of Zambia have a room. A random sample of 400 students undertaken by an independent researcher finds that 54% of the students in the sample have rooms. Use a 5% level of significance to test the Dean of Student's claim.
3. The mean weekly wage for a random sample of $n_1 = 30$ employees at Parklands Service Station in Kitwe is K280 with a standard deviation of K14. At Longacres Service Station in Lusaka, a random sample of $n_2=40$ employees reveals a mean weekly wage of K270 with a mean with a standard deviation of K10. Do you agree with a union member's claim that there is a significant difference in the payments at the two service stations? Use 5% level of significance.
4. The Ministry of Community Development wants to test the effectiveness of a system of rehabilitating offenders recently released from prison through entrepreneurial training. To do this, 100 of the recently released prisoners are trained and equipped with entrepreneurial skills to prevent them from committing any more offenses. The other 200 newly released prisoners are merely sent home but put under strict observation. After about a year of observation, it is discovered that 68 of those of those undergoing training have committed offenses compared to 148 of those not being trained. Is the rehabilitation programme working? Use 5 percent level of significance to answer this question.
5. Last year's retail sales at Spar show that the average monthly expenditure for meat was K11. To make comparisons with this year's expenditure, a researcher takes a random sample of 30 Lusaka families and finds that the average expenditure on meat is K10 with a standard deviation of K1.8. Would you agree or disagree with the researcher's assertion that there is a significant decrease in the average expenditure this year? Use 5% level of significance to test this assertion.
6. A research project by DEM 4110 students on the expenditure patterns of UNZA students after the introduction of the cash system wants to find out if there is a difference in the amount of money that male and female students spend on leisure activities per term. They take equal sized samples of 10 each from the male and female population and record their expenditure patterns during the first term. The figures are given below:

Males	Females
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91	73
69	57
92	96
98	78
70	74
53	55
76	91
90	91
64	50
95	65

Would you agree with someone asserting that females spend more money on leisure activities than males? Use 5% level of significance.

7. A demographer wants to examine whether the relationship between the length of time between marriages and the birth of first child is influenced by the socio-economic status (SES) of the father. The data below is based on his research.

	High SES	Middle SES	Low SES
Sample size	10	10	10
Mean interval between marriage and birth of first child	37.9	23.5	12.5
Grand mean	24.6		
Total sum of squares	3,619.0		

Use ANOVA at 5% level of significance to find out if there are statistically significant differences in the mean interval before the first child for the three social classes.

8. The Dean of HSS wants to know if the number of study hours spent by students outside of class during a three-week period for a course in DEM 2414 has any influence on their examination scores at the end of the period. The coordinator of the course collects the data that is presented below:

Sampled student	1	2	3	4	5	6	7	8
Study hours	20	16	34	23	27	32	18	22
Examination grade	64	61	84	70	88	92	72	77

- a) Compute a least squares regression equation to show the dependence of examination grade on study hours.
- i. Interpret the meaning of the observed regression coefficients within the context of the question.
 - ii. Interpret the meaning of the intercept within the context of the question.
 - iii. If a student spends 30 hours studying, what would be her expected performance in the course?
 - iv. If a student has a grade of 75 in the course, how many hours could he have spent studying?

b) Compute the correlation coefficient and interpret the result.

9. A company is implementing a smoke-free workplace policy and is interested in whether smoking affects worker accidents. Since the company has complete reports on on-the-job accidents, a sample of names of workers is drawn from those who were involved in accidents during the last one year. A similar sample from among workers who had no reported accidents in the last year is also drawn. Members of both groups are interviewed to determine if each is a smoker or non-smoker and if a smoker, whether the person classifies himself or herself as a heavy or moderate smoker. The results are shown in the table below:

	On the job accident		
Smoker	Yes	No	Total
Heavy smoker	12	4	16
Moderate	9	6	15
Nonsmoker	13	22	35
Total	34	32	66

Use 1% level of significance to determine if there is relationship between smoking and accidents. Would you agree with the workers' argument that smoking does not necessarily result in accidents? Demonstrate how you arrived at this conclusion.