

10% (1) Suppose 50% of the graduate students at School of Management own motorcycles while 6% of the upper classmen and 10% of the lower classmen own motorcycles. If School of Management has 112 graduate students, 482 upper classmen and 613 lower classmen.

- (a) What is the probability that a student picked at random will own a motorcycle?
 (b) Given that a student has been selected and does not own a motorcycle, Find the probability that the student is an upper classmen?

15% (2) City government has collect the following data on annual sales tax collections and new car registrations:

Annual Sales Tax collections (millions)	New car registrations (thousands)
1	10
1.4	12
1.9	15
2	16
1.8	14
2.1	17
2.3	20

- Determine: (a) the least squares regression equation
 (b) Find the estimated sales tax collections if new car registrations total 23 using the result of (a).
 (c) Calculate the coefficient of correlation and determination; Comment on the results.

20% (3) A company is interested in estimating μ , the mean number of days of sick leave taken by all its employees. The company's statistician select at random 100 personnel files and take notes on the number of sick days taken by each employee. The following sample statistics are computed:

$$\bar{x} = 12.2 \text{ days}; \quad s = 10 \text{ days}$$

- (a) Estimate μ using a 90% confidence level.
 (b) How many personnel files would the statistician have to select in order to estimate μ within 2 days accuracy at 99% confidence level.

15% (4) Develop the sampling distribution for the range (difference between largest and smallest elements) given a population {8,9,9,11,12,12} from which a random selection of two elements, without replacement, will be made.

20% (5) In checking the reliability of a bank's records, auditing firms sometimes ask a sample of the bank's customers to confirm the accuracy of their savings account balances as reported by the bank. Suppose an auditing firm is interested in estimating the proportion of a bank's savings account on whose balances the bank and the customer disagree. Of 200 savings account customers questioned by the auditors, 15 of them said their balance disagreed with that reported by the bank.

(a) Estimate the actual proportion of the bank's savings accounts on whose balances the bank and customer disagree. (Using a 95% confidence level)

(b) The bank claims that the true fraction of accounts on which there is disagreement is at most 0.05 ; You as an auditor, doubt this claim. Test the bank's claim at a 0.10 significance level.

20% (6) Suppose we wish to compare the percentage of voters favoring each of three political candidates running for the same election position. A random sample of 150 voters are obtained. The resulting data listed below are classified according to a single criterion, "Candidate Preference".

Candidate #1	Candidate #2	Candidate #3
61	53	36

Determine whether these data indicate a voter preference for any of these candidates ?

