

Essay summary of normal distribution



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Therefore, she wanted to know more about her course mates. Obviously it was difficult to contact all the students from her batch and know about them. So she decides to collect a randomly selected data from about 25-30 students. She was not sure about random collection of data. So she learnt about random number generator and used student roll numbers to select the random sample. With the help of faculty she prepared questionnaire and collected data. From the data she prepared report for submission. It was quite nice and elaborate. However, when she compared it with friends, she found lot of variation. So she decided to take information from her two friends who had also collected the similar data.

Of course she has to take some precautions while using the data from the friends. A) b) c) d) e) f) g) h) Collect the data. Draw Simple Bar Diagram to represent specialization wise strength of students. Draw Pie diagram to represent the number of students in each of the blood groups. Prepare the gender-wise frequency table for the blood groups. Plot graph of height Vs.. Weight of the students. Comment on the graph. Plot graph of family income Vs.. Expenditure of the student. Comment on the graph. Calculate gender-wise mean and standard deviation of marks of 10th and 12th standard. Comment on the basis of the results. Prepare a two way table showing age-wise and gender-wise strength of students.

Represent this data with the help of a multiple bar diagram taking age on X axis and gender-wise strength on Y axis. Also comment on the basis of this graph. Prepare a two way table showing father's education and mother's education taking education categories as Below Graduate, Graduate and Post graduate. Comment on the basis of this table. Calculate mean and

standard deviation of marks obtained by the students in 10th and 12th standard according to having a Job experience or not. Comment on the values you obtained. You are free to do additional analysis if you feel so. K) Note: Sample questionnaire is attached. However, please feel free to add few question based on your purpose.

Subject: Statistics & Research Methodology (103) Case No: 04 Microchip Contract A company receives an order for five custom-made microchips at a price of \$7, 500 each. The company will produce the chips one by one using a complex process which has only a 67% chance of producing a defect-free chip at each trial. After five defect- free chips are produced the process will be stopped. A cost accountant at the company has prepared the following cost report: The cost of production includes a \$14, 800 fixed cost and a \$2, XX unit variable cost. Thus if X number of chips are produced, the total cost of production would be $14, 800 + 2 \cdot X$ dollars. The revenue minus the cost of production will be the profit.

After some analysis the financemanager of the company says that the risk may be too high and thinks the order should not be accepted. 1. What distribution will the number of chips produced, X, follow? 2. What is the expected value and standard deviation of X? 3. What is the expected value and standard deviation of the profit? 4 What is the break-even X (allow fractional values for X)? 5. What is the probability that accepting the order will result in a loss? 6. A popular measure of risk in a venture is value at risk, which is the loss suffered at the 5th percentile of the return from the venture. In this problem, find an integer x such that $P[X > x]$ is approximately 5%. 7. For the x value found in part 6, calculate the loss, and thus the value

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at risk. Express the value at risk as a percentage of the expected value of the profit. 9. What is your assessment of the risk and reward in the order? Should the company accept the order? The sales manager of the company says that the customer is very likely to agree to increase the order quantity from five to eight chips. But he is not sure whether the matter should be pursued with the customer. 10. If accepting an order of five itself is risky, will it not be even more risky to accept an order for eight? asks the sales manager. How would you answer? 11. Calculate the expected value and standard deviation of the profit for an order quantity of eight. 12.

What is the value at risk for an order quantity of eight, computed in a manner similar to parts 6 and 7 above? Express the value at risk as a percentage of the expected profit. 13. Looking at the answer to parts 3, 8, 11, and 12, would you say the risk and reward have become more favorable, compared to an order quantity of five? 14. Should the company pursue the matter of increasing the order quantity to eight with the customer? * Case taken from Complete Business Statistics by Amir Cell & J. Countermanding, DATA Mac Grab Hill. Subject: Statistics & Research Methodology (103) Case No: 05 Acceptable Pins A company supplies pins in bulk to a customer. The company uses an automatic lathe to produce the pins.

Due to many causes- vibrations, temperature, wear and tear, and the like- the lengths of the pins made by the machine are normally distributed with a mean of 1.012 inches and a standard deviation of 0.018 inch. The customer will buy only those pins with lengths in the interval 1.00 ± 0.02 inch. In other words, the customer wants the length to be 1.00 inch but will accept up to 0.02 inch deviation on either side. This 0.02 inch is known as the

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tolerance. 1 . What percentage of the pins will be acceptable to the consumer? In order to improve percentage accepted, the production manager and the engineers discuss adjusting the population mean and standard deviation of the length of the pins. 2.

If the lathe can be adjusted to have the mean of the lengths to any desired value, what should it be adjusted to? Why? 3. Suppose the mean cannot be adjusted, but the standard deviation can be reduced. What maximum value of the standard deviation would make 90% of the parts acceptable to the consumer? (Assume the mean to be 1. 012.) 4. Repeat question 3, with 95% and 99% of the pins acceptable. 5. In practice, which one do you think is easier to adjust, the mean or the standard deviation? Why? The production manager then considers the costs involved. The cost of resetting the machine to adjust the population mean involves the engineers' time and the cost of production time lost.

The cost of reducing the population standard deviation involves, in addition to these costs, the cost of overhauling the machine and engineering the process. 6. Assume it costs \$ x to decrease the standard deviation by ($x - 11000$) inch. Find the cost of reducing the standard deviation to the values found in question 3 and 4. 7. Now assume that the mean has been adjusted to the best value found in question 2 at a cost of \$80. Calculate the reduction in standard deviation necessary to have 90%, 95%, and 99% of the parts acceptable. Calculate the respective costs, as in questions. 8. Based on your answers to questions 6 and 7, what are your recommended mean and standard deviation?