

Activity Sheet

Please go through 'Central Tendency' slides of today's lecture and spend time in understanding the concepts, examples problems explained and then solve the problems given below.

Activity - 1

- Two people work in a factory making parts for cars. The table shows how many complete parts they make in one week.

Worker	Mon	Tue	Wed	Thu	Fri
Philip	20	21	22	20	21
Mathews	30	15	12	36	28

- Find the mean, median and range for Philip and Mathews.
 - Who is more consistent?
- Find the mode for 8,6,2,4,6,8,10,8
 - Analyze the performance of your class in the first WUQ taken at INSOFE

Scores: 11, 7.5, 8.5, 10, 10, 10.5, 5.5, 10, 9, 9.5, 5.25, 8, 6.5, 10.5, 8.75, 0, 6, 6, 6.75, 8.75, 0, 9.5, 7.5, 8.5, 7
 - How is the spread of the scores? Compute range, variance & standard deviation
 - Find the 25th percentile, 50th percentile and 75 percentile for this data.
 - Temperatures in 5 cities measured on 12 days is given below. The weather department says that two cities have similar weather. Use central tendencies to identify those two cities

City 1	29	32	36	40	43	37	36	33	32	37	31	29
City 2	20	24	31	37	40	38	37	34	34	33	28	23
City 3	23	26	32	38	41	40	35	33	35	37	30	25
City 4	20	24	29	34	37	36	32	30	33	32	27	23
City 5	19	24	29	38	43	38	33	34	36	34	29	23

- What is the probability that we get a 5th Tuesday in a 30-day month?

6. Below is a table of graduates and post graduates

	Graduate	Post Graduate	Total
Male	19	41	60
Female	12	28	40
Total	31	69	100

- What is the probability that a randomly selected individual is a male and a graduate? What kind of probability is it (Marginal/ Joint/Conditional)
 - What is the probability that a randomly selected individual is a male?
 - What is the probability of a randomly selected individual being a graduate? What kind of probability is this?
 - What is the probability that a randomly selected person is a female given that the selected person is a post graduate? What kind of probability is this?
7. In a particular region during a 1year period, there were 1000 deaths. It was observed that 321 people died of a renal failure and 460 people had atleast one parent with renal failure. Of these 460 people, 115 died of renal failure. Calculate the probability of a person that he dies of renal failure if neither of his parents had a renal failure
8. 0.5 percent of the population of an area is affected by a particular disease. A test is developed to detect the disease. This test gives a false positive 3% of the time and false negative 2% of the time.
- Draw the tree diagram for this problem.
 - What is the probability that the test gives a positive result?
 - If a person's test turns out to be positive, what is the probability that he actually has the disease
9. Let three fair coins be tossed. Let Event A = {all heads or all tails}, Event B = {at least two heads}, and Event C = {at most two tails}. Of the pairs of events, (A,B), (A,C), and (B,C), which are independent and which are dependent? (Justify).
10. A bank has developed an analytical model that helps them assess the credit worthiness of individuals and offer loans accordingly. To validate the performance of the model, they constructed a classification matrix on historical data.

	Predicted as credit worthy	Predicted as not credit worthy
Truly credit worthy	8000	900
Truly not credit worthy	100	1000

- a. Identify “True Positives, True Negatives, False positives and False Negatives” from the table and compute “Accuracy, Precision, Recall and F1 statistic”. (Please write the formula used to calculate each metric and substitute appropriate values to score.)
- b. In this analysis, will you be more worried about false positives or false negatives?

11. Let us suppose, you tossed two two-sided fair coins:

- a. Compute the PMF for heads in this experiment
- b. Compute Expectation of heads

12. For a given probability density function

$$f(x) = \begin{cases} 3x^{-4}, & x > 1 \\ 0, & \text{elsewhere} \end{cases}$$

Find the following:

- c. $(X = 2)$
- d. $P(X \leq 4)$
- e. $P(X < 1)$
- f. $P(2 \leq X \leq 3)$