**Topics: Descriptive Statistics and Probability**

1. Look at the data given below. Plot the data, find the outliers and find out

|  |  |
| --- | --- |
| **Name of company** | **Measure X** |
| Allied Signal | 24.23% |
| Bankers Trust | 25.53% |
| General Mills | 25.41% |
| ITT Industries | 24.14% |
| J.P.Morgan & Co. | 29.62% |
| Lehman Brothers | 28.25% |
| Marriott | 25.81% |
| MCI | 24.39% |
| Merrill Lynch | 40.26% |
| Microsoft | 32.95% |
| Morgan Stanley | 91.36% |
| Sun Microsystems | 25.99% |
| Travelers | 39.42% |
| US Airways | 26.71% |
| Warner-Lambert | 35.00% |



Answer the following three questions based on the box-plot above.

1. What is inter-quartile range of this dataset? (please approximate the numbers) In one line, explain what this value implies.

**IQR=(12-50)=7,50% OF THE DATA & MEDIAN CONCENTRATED HERE**

1. What can we say about the skewness of this dataset?

**+VE SKEWED/ RIGHT SKEWED**

1. If it was found that the data point with the value 25 is actually 2.5, how would the new box-plot be affected?

**IT WILL NOT CONSIST OF ANY OUTLIER IF IT WAS FOUND THAT THE DATA POINT IS ACTUALLY 2.5 INSTEAD OF 25, THE OUTLIER IN THE BOXPLOT WILL BE REMOVED.**

**WHETHER THE MEDIAN SHIFTS OR NOT DEPENDS ON THE SIZE OF THE DATA.**

**IT WILL REDUCE THE RIGHT SKEWNESS OF THE DATA.**



Answer the following three questions based on the histogram above.

1. Where would the mode of this dataset lie? **5, 15(BIMODAL)**
2. Comment on the skewness of the dataset. **+VE SKEWED**

Suppose that the above histogram and the box-plot in question 2 are plotted for the same dataset. Explain how these graphs complement each other in providing information about any dataset. **IN TERMS OF SKEWNES, MAX DATA CONCENTRATION , FREEQUENCY DISTRIBUTION AND OUTLIERS O/P REMAINS SAME FROM THE ABOVE HISTOGRAM AND BARPLOT WE CAN CONFIRM AN OUTLIER AT 25 IN Y VALUE. BOTH THE PLOTS INDICATE THE +VE SKEWNESS OF THE DATASET**.

1. AT&T was running commercials in 1990 aimed at luring back customers who had switched to one of the other long-distance phone service providers. One such commercial shows a businessman trying to reach Phoenix and mistakenly getting Fiji, where a half-naked native on a beach responds incomprehensibly in Polynesian. When asked about this advertisement, AT&T admitted that the portrayed incident did not actually take place but added that this was an enactment of something that “could happen.” Suppose that one in 200 long-distance telephone calls is misdirected. What is the probability that at least one in five attempted telephone calls reaches the wrong number? (Assume independence of attempts.)

**Ans : LET US CONSIDER THE PROBABILITY OF 1 CALL MISDIRECTED OUT OF 200 AS EVENT A.**

**PROBABILITY OF OCCURRING OF EVENT A= 1/200**

**P(A)= 1/200**

**PROBABILITY OF HAVING AT LEAST ONE SUCCESSFUL CALL WILL BE**

**1-P(A)= 1-1/200= 199/200= 0.967**

**AS EVERY EVENT IS INDEPENDENT OF OTHER EVENT THE PROBABILITY WILL BE**

**1- (0.967)^5**

**0.02475 = 2% CHANCE**

1. Returns on a certain business venture, to the nearest $1,000, are known to follow the following probability distribution

|  |  |
| --- | --- |
| x | P(x) |
| -2,000 | 0.1 |
| -1,000 | 0.1 |
| 0 | 0.2 |
| 1000 | 0.2 |
| 2000 | 0.3 |
| 3000 | 0.1 |

1. What is the most likely monetary outcome of the business venture?

**2000**

1. Is the venture likely to be successful? Explain

**20%= -ve , 60%= +ve hence, it is going to be succefull**

1. What is the long-term average earning of business ventures of this kind? Explain

**E[X]=((-2000\*0.1)+(-1000\*0.1)+(0\*0.2)+(1000\*0.2)+(2000\*0.3)+(3000\*0.1)=800**

1. What is the good measure of the risk involved in a venture of this kind? Compute this measure

**As per above ans (2) the 60% probability of getting profitable returns**

**RISK STEMS FROM THE POSSIBLE VARIABILITY IN THE EXPECTED RETURNS. THEREFORE A GOOD MEASURE TO EVALUATE THE RISK FOR A VENTURE OF THIS KIND WOULD BE VARIANCE OR STANDARD DEVIATION OF THE VARIABLE X.**

**> DF[“X”].STD()**

**1870.829**

**> DF[“X”].VAR()**

**3500000**

**THE LARGE VALUE OF STANDARD DEVIATION OF $1870 IS CONSIDERED ALONG WITH THE AVERAGE RETURNS OF $800 INDICATES THAT THIS VENTURE IS HIGHLY RISKY.**