**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% |

1. Outlier= Morgan Stanley – 91.36%

Mean=33.27

Standard Deviation=16.95

Variance=287.14



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.

Ans) IQR=7,this is where the bulk of the data will be there and 2nd quartile range is the median=7

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

Ans)Positively 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?

Ans)Median will change but it will remain positively skewed and there will be no outliers.



Answer the following three questions based on the histogram above.

1. Where would the mode of this dataset lie?

Ans) Between 4-7

1. Comment on the skewness of the dataset.

Ans) Positively skewed.

1. 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.

Ans) Both graphs give information about skewness and outliers. Median is visualized in boxplot and mode in histogram.

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) If 1 in 200 calls are getting misdirected then

Probability of calls getting misdirected = 1/200

Probability of calls not getting misdirected= 1-(1/200)=199/200=0.995^4

The probability for at least one in five attempted telephone calls reaches the wrong number

n=5

x=1

p=1/200

q=199/200=0.995

p.d.f=(n!/(n-x)!\*x!)\*(p)^(x) \*(q)^(n-x)

=(5!/(5-1)1\*1!)\*(1/200)^(1) \* (0.995)^(5-1)

= (5\*4\*3\*2\*1/4\*3\*2\*1\*1)\*(1/200)\*0.9801

=(5/200)\*0.9801

= 0.0245025

Therefore, the probability for at least one in five attempted telephone calls reaches the wrong number is 0.00245025

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 |

E(x) =Sum x.\*P(x) | E(x^2) =x^2\*P(x)

-200             | 400000

-100                 | 100000

0             | 0

200       | 200000

600         | 1200000

300         | 900000

Total: 800         | 2800000

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

Ans) The most likely monetary outcome of the business venture is $2000 because its probability is more as compared to others.

1. Is the venture likely to be successful? Explain

Ans) The probability of getting more than 0 / profit is more because the sum of all probability is p(x>0)+p(x>1000)+p(x>2000)+p(x>3000)= is 0.8 which is there is a 80% chance of getting profit.

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

Ans) The long term average earning is sum(x\*P(x)) is $800 which means the there will be +$800 as returns.

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

Ans) The good measure of the risk involved in a venture of this kind depends on the Variability in the distribution. Higher the variance higher chances of risk

Var (x) = E(x^2) –(E(x))^2

= 2800000 - 800^2

= 2800000 - 640000

= 2160000