**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.

Ans: Q1 = 5 , Q3 = 12

IQR = 12 – 5 = 7

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

Ans: We can see from the box that more data concentrated on left side while there is less concentration on the right side and having more variability , that means data is 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?

Ans: If it was found that the data point with the value 25 is actually 2.5 , the median will remain same ,but the IQR will change. And there will not have any outlier anymore.



Answer the following three questions based on the histogram above.

1. Where would the mode of this dataset lie?

Ans: The mode of data set lie in between 4 to 8.

1. Comment on the skewness of the dataset.

Ans: We can see that Mean>Median>Mode . More data concentrated on the left side

of the histogram so it is right 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 are right skewed and both have outliers ,from boxplot we can clearly see

Median where as from histogram we can clearly see Mode of the data.

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: one in 200 long-distance telephone calls is misdirected

probability of call misdirecting  p(wn) = 1/200 = 0.005

  Probability of not wrong number: 1 - P(WN) =1- 1/200 = 0.995

Probability of at least one out of five is a wrong number= 1– Probability that all five

calls are not wrong numbers= 1 – (1 –P(WN))^5

= 1 – (1-0.005)^5= 1 – 0.975= 0.024= 2.5%

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?

Ans: x=2000 with highest probability of 0.3

1. Is the venture likely to be successful? Explain

Ans: Yes, the probability that the venture will make more than 0 or a profit p(x>0)+p(x>1000)+p(x>2000)+p(x=3000) = 0.2+0.2+0.3+0.1 = 0.8 this states that there is a good 80% chances for this venture to be making a profit.

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

Ans: p (x) \* x = (-2000\*0.1) + (-1000\*0.1) + (0\*0.2) + (1000\*0.2) + (2000\*0.3) + (3000\*0.1) = - 200 -100 + 0 + 200 + 600 + 300 = 800

Means on an average Return will be 800 $

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 variance means more chance of risk.

Var (x) = E(X^2) – (E(X))^2 = 2800000 – 800^2 = 2160000