**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% |

Ans : The outlier is Morgan Stanley.

Mean=33.27, statndard daviation=16.94,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

Second Quartile Range is the Median Value.

The IQR tells us about the spread of the middle halfof our data set.

The second quartile is the median value which is 7.

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

Ans : the 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 : The box plot wont be affected because 25 is an outlier.



Answer the following three questions based on the histogram above.

1. Where would the mode of this dataset lie?

Ans : The mode lies between 4 to 8.

1. Comment on the skewness of the dataset.

Ans : 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 : From both the figures we can see that the data set is right skewed and has 25 as outlier.

The box plot gives us IQR and outliers while the histogram tells us about the frequency distribution. We can clearly see the median from the box plot whereas it is not so clear in the 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 long-distance telephone calls are getting misdirected.

probability of call misdirecting = 1/200

Probability of call not Misdirecting = 1-1/200 = 199/200

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

Number of Calls = 5

n = 5

p = 1/200

q = 199/200

P(x) = at least one in five attempted telephone calls reaches the wrong number

P(x) = ⁿCₓ pˣ qⁿ⁻ˣ

P(x) = (nCx) (p^x) (q^n-x) # nCr = n! / r! \* (n - r)!

P(1) = (5C1) (1/200)^1 (199/200)^5-1

P(1) = 0.0245037

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 : 2000$

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=3000) = 0.2+0.2+0.3+0.1 = 0.8

This says that there is a good 80% chance for this venture make this profit.

1. What is the long-term average earning of business ventures of this kind? Explain
2. Ans : the long-term average earning of business ventures is the expected value=∑Pi\*Xi

=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 chances of risk.

Var (X) = E(X^2) –(E(X))^2

= 2800000 – 800^2

= 2160000.