**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.

Answer: Q3=12(appr) and Q1=5

IQR= Q3-Q1 =12-5 =7(appr)

Inter-quartile range of this dataset is 7

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

Answer: Skewness of this dataset is positive skewed or 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?

Answer: There will be no outliers, and the boxplot will slightly move towards the right side then the median value will change.



Answer the following three questions based on the histogram above.

1. Where would the mode of this dataset lie?
2. Comment on the skewness of the dataset.
3. 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.

Answer:(i): The mode of this dataset lies 4-7 range(appr) with longer tail

(ii): The skewness of the dataset is right skew(+ve)

(iii):By comparing the histogram and boxplot we can say that both of the data is right skewed and they have the outliers.

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.)

Answer: There we are having two changes that is getting a misdirected and not getting a misdirected=1/2+1/2=1(Total probability is 1)

Given that probability of getting a call is misdirected=1/200

Then the probability of not getting a call is misdirected=1-1/200 =199/200

And also given n=5

Then probability that at least one is five attempted telephone calls reaches the wrong number=1-(199/200)\*5

=0.025

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?
2. Is the venture likely to be successful? Explain
3. What is the long-term average earning of business ventures of this kind? Explain
4. What is the good measure of the risk involved in a venture of this kind? Compute this measure

Answer:(i): The most likely monetary outcome of the business venture is x=2000 with highest probability is 0.3

(ii):The probability of positive is more than the probability of negative so, the venture likely to be successful is p(x=0)+ p(x=1000)+p(x=2000)+p(x=3000)=0.2+ 0.2+0.3+0.1=0.8

(iii):The long-term average E(x)=x\*p(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

(iv):The good measure of the risk involved in a venture of this kind is standard deviation