**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 = 7

50% of data lies between the IQR

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

* There is a positive Skewness

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?

* The mean and median would change accordingly, also the outlier at 25 will vanish as the original value is 2.5 only.

3.



Answer the following three questions based on the histogram above.

1. Where would the mode of this dataset lie?

* The mode is expected to be lying between 4 and 10 as most of the data lies among this range.

1. Comment on the skewness of the dataset.

* There is a positive skewness.

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.

* The inferences from both the plots are:

1. There are outliers for the data point 25.
2. There is a positive skewness
3. 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.)

* Let X be the event (1 misdirected call in 200).

Then, P(X) = 1/200

P(successful call) = 1- P(X)

= 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?

* The most likely monetary outcome would be $2000.

1. Is the venture likely to be successful? Explain

* Total probabilities = 0.1+0.2+0.3 = 0.6 =60%

There is a 60% chance for success

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

* (-2000\*0.1)+(-1000\*0.1)+(0\*0.2)+(1000\*0.2)+(2000 \*0.3)+(3000\*0.1)=800

The long term average would be $800.

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

* A good measure to evaluate the risk involved would be to calculate the variance and standard deviation for x.

Var = 3500000

Std dev = 1870.83

The large value of std dev which is $1870.83 along with average earning of $800 makes this venture highly risky.