**Topics: Descriptive Statistics and Probability**

1. Look at the data given below. Plot the data, find the outliers and find out

|  |  |
| --- | --- |
| Mean | 0.332713 |
| Std dev | 0.169454 |
| variance | 0.028715 |

Outlier is morgan Stanley 91.36%

|  |  |
| --- | --- |
| **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.

q3-q1 = 12-5=7

this represent the range which contains 50% of data points

Minimum value = 0

Maximum value = 20

Q1: First quartile = 5

Q2: Second quartile or median= 67

Q3: Third quartile = 12

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

Right 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?

2.5 will not be consider as outlier the boxplot will start at 0 and send at 20 in representation



Answer the following three questions based on the histogram above.

1. Where would the mode of this dataset lie?

**ANS**  mode lies between 4 to 8

1. Comment on the skewness of the dataset.

**ANS** dataset 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** Median in boxplot and Mode in histogram

Histogram provides the frequency distribution so we can see how many times each data point is occurring however boxplot provides the quantile distribution i.e. 50% data lies between 5 and 12.

Boxplot provides whisker length to identify outliers, no information from histogram. We can only guess looking at the gap that 25 may be an outlier.

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.)

Probability that at least one in 5 attempted call reaches the wrong number is 0.025

Explanation:

Let us define an event

E: The call is misdirected

then probability of the event E is

P(E) = 1/200

P(E)bar =1-P(E)= 1-1/200 = 199/200

Therefore,

Probability that at least one in 5 attempted call reaches the wrong number

= 1 - Probability that no attempted call reaches the wrong number

1-(199/200\*199/200\*199/200\*199/200\*199/200)

= 0.02475

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** (0.1\*-2,000)+(0.1\*-1000)+(0.2\*0)+(0.2\*1000)+(0.3\*2000)+(0.1\*3000)

=

1. Is the venture likely to be successful? Explain

**ANS** Based on data we can look at positive returns as a measure of success

The probability distribution give us an idea about an long term chances of earning given values of returns(indicate by x). therefore there is (0.2+0.3+0.1 = 0.6) probability that venture will be successful

Venture can be 60% likely to be succed

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

**ANS** (0.1\*-2,000)+(0.1\*-1000)+(0.2\*0)+(0.2\*1000)+(0.3\*2000)+(0.1\*3000)

=800

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

the good measure of the risk involved in a venture of this kind is standard deviation

|  |  |
| --- | --- |
| std dev | 1288.039 |