**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% |

Mean = 33.27%

Standard deviation = 16.94%

Variance = 287.14

Outlier = One outlier (Morgan Stanley – 91.36%)



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.

Upper quartile Q3 = 12

Lower quartile Q1 = 5

Therefore, IQR = 12-5 = 7

IQR depicts the location 50% of the data in the distribution.

Here, 50% of the data lies between 5 to 12 and range of this data is 7.

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

The data is positively 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?

The new boxplot will not have the outlier and this point will be included in the whisker on the minimum side.



Answer the following three questions based on the histogram above.

1. Where would the mode of this dataset lie?

The mode would be near Y=5/6

1. Comment on the skewness of the dataset.

The data is positively skewed as it has a long tail on the right side.

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 histogram gives information about the mode of the dataset.

Box plot helps us find the outliers in the dataset.

Box plot also gives information about the median of the dataset.

Range of the data is more clearly visible in the boxplot.

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 of wrong number = p = 1/200

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

Number of Calls = 5

n = 5

p = 1/200

q = 199/200

P(x) = nCx \* p^x \* q^n-x

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

= 1  -  none of the call reaches the wrong number

= 1  - P(0)

= 1   -  ⁵C₀(1/200)⁰(199/200)⁵⁻⁰

= 1  -  (199/200)⁵

= 0.02475

Hence, probability that at least one in five attempted telephone calls reaches wrong number

= 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?

Most likely monetary outcome of the business venture will be $2000 as it has the maximum probability.

1. Is the venture likely to be successful? Explain

Yes the venture is likely to be successful as the probability of making profits is more than the probability of making a loss.

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

Long term avg business earnings =  ∑ (x)\*P(x)

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

= $800

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

The risk probability will be the sum of loss making outcomes.

In this case = 0.1 + 0.1 = 0.2 = 20%

There is a risk of 20% in this type of venture.