**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%** |
| **JPMorgan & 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:**

A colorful pie chart with white text

Description automatically generated

A graph with a bar

Description automatically generated with medium confidence

The following is the outlier in the boxplot: Morgan Stanley 91.36%

Mean = 33.271333

Standard deviation = 16.945401

Variance = 287.1466123809524



**Answer the following three questions based on the boxplot above.**

1. **What is the inter-quartile range of this dataset? (Please approximate the numbers) In one line, explain what this value implies.**

**Answer:**

Approximately (First Quantile Range) Q1 = 5   
(Third Quantile Range) Q3 = 12, Median   
(Second Quartile Range) Q2 = 7

IQR = Q3 – Q1 = 12 – 5 = 7

Second Quartile Range is the Median Value

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

**Answer:**

Right-Skewed median is towards the left side it is not normal distribution.

1. **If it was found that the data point with the value 25 is actually 2.5, how would the new boxplot be affected?**

**Answer:**

In that case, there wouldn't be any outliers on the dataset since the outlier's data would have reduced positive skewness and been normally distributed.



**Answer the following three questions based on the histogram above.**

1. **Where would the mode of this dataset lie?**

**Answer:**

The mode of this data set lies in between 5 to 10.

1. **Comment on the skewness of the dataset.**

**Answer:**

Positively 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.**

**Answer:**

They are both right skewed and have outliers. The median may be easily visualized in a box plot, whereas it is clearer in histogram mode.

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:**

Know that 1 in 200 calls is a mistake (misdirected).

We want to find the chance that at least one out of five calls is a mistake.

Calculate the chance that a single call is NOT a mistake:  
Probability of a call being correct = 1 - (1/200) = 199/200

Now, subtract this probability from 1 to find the probability that at least one call is misdirected:

1 - [(199/200) ^5] = 0.0246

So, the probability that at least one in five attempted telephone calls reaches the wrong number is approximately 0.0246, or about 2.46%.

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** |

**Answer:**

|  |  |
| --- | --- |
| -200 | 4000 |
| -100 | 100000 |
| 0 | 0 |
| 200 | 200000 |
| 600 | 1200000 |
| 300 | 900000 |
| **Total: 800** | **2404000** |

1. **What is the most likely monetary outcome of the business venture?**

**Answer:**

The business venture's expected financial return is $2000.

In comparison to other amounts, the likelihood for 2000 dollars is the highest at 0.3.

1. **Is the venture likely to be successful? Explain**

**Answer:**

Yes, the probability that the business will be profitable or make more than zero is  
 p(x>0) +p(x>1000) +p(x>2000) +p(x=3000) = 0.2, 0.2, 0.3, 0.1,0.8.   
This indicates that there are a good 80% possibilities that this business will be profitable.

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

**Answer:**

The long-term average expected value = Sum (X \* P(X)) = 800$, indicates that returns will typically be positive 800$.

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

**Answer:**

Risk depends on the variation of data. The larger the variance the more the risk is involved.

Variance for the data given above is: 12,00,000

Standard deviation is 1095.44.