**Topics: Descriptive Statistics and Probability**

|  |  |
| --- | --- |
| **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% |

**Attached: Descriptive Statistics and Probability.ipynb file**



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.

**Solution:** Approximately Q1 = 5, Q3 = 12

Median (Second Quartile Range Q2) Q2 = Q3-Q1

Q2 = 12 - 5 = 7

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

**Solution:**

**It’s not a normal distribution. Right-skewed median is towards the left side.**

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?

**Solution:**

In that case there would be no Outliers in the given dataset, because of the outlier the data had positive skewness it will reduce and the data will be normal distributed.



Answer the following three questions based on the histogram above.

1. Where would the mode of this dataset lie?

**Solution:**

The mode of this data set lie in between 5 to 10 and apporx between 4 to 8.

1. Comment on the skewness of the dataset.

**Solution:**

Right Skewed.

Mean > Median > Mode

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.

**Solution:**

**They both are right-skewed and both have outliers the median can be easily visualised in the box plot where as in Histogram mode is more visible.**

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.)**

**Solution:**

Probability of call getting misdirected P = (1/200)

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

Number of calls = 5

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

= 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?

**Solution:**

Highest probability is for 2000

1. Is the venture likely to be successful? Explain

**Solution:**

Yes, because the total earnings of the venture is positive in value i.e, 800 and highest probability of earning is 2000

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

**Solution:**

Income = x \* p(x)

|  |  |  |
| --- | --- | --- |
| x | P(x) | X \*p(x) |
| -2,000 | 0.1 | -200 |
| -1,000 | 0.1 | -100 |
| 0 | 0.2 | 0 |
| 1000 | 0.2 | 200 |
| 2000 | 0.3 | 600 |
| 3000 | 0.1 | 300 |
| **Total** |  | **800** |

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

**Solution:**

|  |  |  |
| --- | --- | --- |
| x | P(x) | X \*p(x) |
| -2,000 | 0.1 | -200 |
| -1,000 | 0.1 | -100 |
| 0 | 0.2 | 0 |
| 1000 | 0.2 | 200 |
| 2000 | 0.3 | 600 |
| 3000 | 0.1 | 300 |
| **Total** |  | **800** |

Variance :

Var (X) = E(X^2) –(E(X))^2 = 2800000 – 800^2 = 2160000