**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 = 0.3327 =33.27, = 0.1695 =16.95, = 0.02871466 =287.15**

**Outlier – There is one outlier which is 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**.**

**Approximately First Quartile Q1 = 5 Third Quantile Q3 = 12, Median - Second Quartile = 7, Inter-Quartile Range IQR = Q3 – Q1 = 12 – 5 = 7 so, Second Quartile Range is the Median Value.**

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

**Skewness right Skewed because median is towards left side so it is not following normal distribution.**

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?

**There is no Outliers, Skewness is 0 also mean=median so it is distributed equally, follows normal distribution.**



Answer the following three questions based on the histogram above.

1. Where would the mode of this dataset lie?

**Mode lies between approximately 4 to 8**

1. Comment on the skewness of the dataset.

**Right Skewed mean>median**

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.

**Both are right skewed, both have outliers on data point 25(approx), median is 7 as per boxplot it 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:**

**1 in 200 long-distance telephone calls are getting misdirected.  
probability of call misdirecting p= 1/200**

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

**The probability for at least one in five attempted telephone calls reaches the wrong number Number of Calls = 5C1**

**P(x) = at least one in five attempted telephone calls reaches the wrong number P(x) = ⁿCₓ pˣ qⁿ⁻ˣ P(1) = (5C1) (1/200)^1 (199/200)^5-1**

**P(1) = 0.0245037**

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 monetary outcome is x=2000 because that is having high probability than other.**

1. Is the venture likely to be successful? Explain

**Probability of profit is p(x>0)+p(x>1000)+p(x>2000)+p(x=3000)=0.2+0.2+0.3+0.1**

**=0.8 = 80%**

**So, the business giving good profit of 80% so the venture likely to be successful one.**

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

**Long term Average means Expected value = sum(x\*p(x))**

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

**=-200-100+0+200+600+300**

**=800**

**An Average return will be $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 depends on the Variability in the distribution. Higher Variance means more chances of risk Var (X) = E(X^2) –(E(X))^2 = 2800000 – 800^2 = 2160000**