**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%** |



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.**

Ans : the inter-quartile range of this dataset is 7

i.e. Q1=5 Q3=13

inter-quartile range = Q3-Q1

= 13-5 =7

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

Ans : It is Right-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?**

Ans : if the value is 2.5 then there will be no outlier



Answer the following three questions based on the histogram above.

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

Ans : Most of this dataset lies between 5 to 10

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

Ans : It is +ve skewed data (Most of the data is in right side 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.**

Ans: both are +ve skewed data & in both outlier is easily 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.)**

Ans**:**

IF 1 in 200 long-distance telephone calls are getting misdirected.  
probability of call misdirecting = 1/200 Probability of call not Misdirecting = 1-1/200 = 199/200 The probability for at least one in five attempted telephone calls reaches the wrong number Number of Calls = 5 n = 5 p = 1/200 q = 199/200 P(x) = at least one in five attempted telephone calls reaches the wrong number

P(x) = ⁿCₓ pˣ qⁿ⁻ˣ P(x) = (nCx) (p^x) (q^n-x) # nCr = n! / r! \* (n - r)! 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?**

**Ans:** The most likely monetary outcome of the business venture is 2000$

As for 2000$ the probability is 0.3

which is maximum as compared to others.

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

**Ans: yes** , From the given probability distribution

The probability that It will make more than 0 is

P(x>0) = p(x>3000) + p(x>2000) + p(x>1000)

P(x>0) = 0.1 + 0.2 + 0.3 i.e. p(x>0) = 0.8

This states that there is 80% chances for making profit**.**

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

Ans: The long term average would be sum ( x\*p(x) ) = 800$

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

**Ans:** 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

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