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:**

IQR= 12.4 - 5 = 7.4(aprrox)

It defines the spread of data in the center of data distribution

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

**ANS:** Right whisker is longer hence 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?

**ANS:** The median will remain same but the IQR will change and their will no outlier.



Answer the following three questions based on the histogram above.

1. Where would the mode of this dataset lie?

**ANS:** The Mode of dataset lie at 4 to 8 position in Y axis

1. Comment on the skewness of the dataset.

**ANS:** The data is 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.

**ANS:** Histogram gives us good sense of distribution of a variable. Boxplot is used detect outlier.

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

1. Is the venture likely to be successful? Explain

**Ans:** Yes the business would be in profit as venture will make more than ) or a profit

**P(x>0)+ P(x>1000)+ P(x>2000)+ P(x>3000)= 0.2+0.2+0.3+0.1=0.8**

**0.8 states that there is 80% chance that venture will make profit.**

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

ANS: Long term Expected outcome of venture would be

**-**200\*0.1+(-1000)\*0.1+0.2+1000\*0.2+2000\*0.3+3000\*0.1

**=800**

**As the sum of all probability and earnings turns out as 800 that means venture would make at least 800$.**

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

**Ans:** Expected long term earning = 800, sum of earnings = 2800000

**Var(x) = E(x)^2-**{E(X)}^2

**= 2800000-**800^2

**=2160000**

**SD=√var=$1470**

**As variance is too high hence Risk is High**