**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: Q1 = 5, Q2 = 7, Q3 = 12

IQR = Q3 – Q1 = 12 – 5 = 7

This implies that the Interquartile Range of the middle 50% data is 7.

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

Ans: The above dataset is positively skewed. Tail is found extending towards right side of the curve.

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: In that case , there would be no outliers on the given dataset because of the outlier the data had positive skewness, it will reduce and the data will be normally distributed.



Answer the following three questions based on the histogram above.

1. Where would the mode of this dataset lie?

Ans: Mode of the above data set lies between 4 and 8 approximately.

1. Comment on the skewness of the dataset.

Ans: The above dataset is 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.

Ans: Both the plots are positively skewed and has outliers , the median can be easily visualized in the box plot, whereas in histogram the 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.)

Ans: If 1 in 200 long distance calls are getting misdirected.

Probability of calls 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 = 5n = 5 p = 1/200 q = 199/200 P(x) = at least one in five attempted telephone calls reaches the wrong number 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 |

xP(x) = -2000(0.1) -1000(0.1) 0 (0.2) 1000(0.2) 2000(0.3) 3000(0.1)

E(x) = sum x.P(x) | E(x^2) = x^2 P(x) - 200 |400000 –

100 | 100000

0|0

200 | 200000

600 | 1200000

1. | 900000
2. What is the most likely monetary outcome of the business venture?

* The most likely monetary outcome corresponds to the highest probability in the distribution. In this case, it’s the value of x where P(x) is maximum. Looking at the probability distribution, the most likely monetary outcome is 2000 with a probability of 0.3.

1. Is the venture likely to be successful? Explain

* Success or failure is subjective and depends on the context and the goals of the business venture. In terms of financial gain, if we consider a positive return as success, then the venture is likely to be successful because the probabilities of positive returns (1000 and 2000) sum up to 0.5, which is higher than the probabilities of negative returns.

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

* The long-term average earnings are given by the expected value (E(x)), ehich is calculated as the sum of x. P(x) for all possible outcomes. Using the provided distribution:

E(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

E(x) = 800

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

* Variance (Var(x)) is a measure of the risk involved. It is calculated as

E(x^2) - [E(x)]^2.

You've already computed E(x^2) and E(x) in your calculations. Now plug these values into the formula to find the variance.

Var(x) = E(x^2) - [E(x)]^2

You have already calculated E(x^2) - E(x), so plug these values into the formula.

Var(x) = 1200000 - (800)^2

= 1200000 - 640000

= 560000

So, the correct variance (risk measure) for the business venture is 560000. I appreciate your understanding, and I apologize for any confusion caused by the error in my previous response.