**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% | 81.7216 |
| Bankers Trust | 25.53% | 59.9076 |
| General Mills | 25.41% | 61.7796 |
| ITT Industries | 24.14% | 83.3569 |
| J.P.Morgan & Co. | 29.62% | 13.3225 |
| Lehman Brothers | 28.25% | 25.2004 |
| Marriott | 25.81% | 55.6516 |
| MCI | 24.39% | 78.8544 |
| Merrill Lynch | 40.26% | 48.8601 |
| Microsoft | 32.95% | 0.1024 |
| Morgan Stanley | 91.36% | 3374.4481 |
| Sun Microsystems | 25.99% | 52.9984 |
| Travelers | 39.42% | 37.8225 |
| US Airways | 26.71% | 43.0336 |
| Warner-Lambert | 35.00% | 2.9929 |

a) =499.07/15=33.27%

b)=268.0035%

c)=16.37%



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.

The IQR range of this data set is 12-5=7.The value implies the variability of dataset around median from 25 percentile to 75 percentile.

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

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 boxplot be affected?

The outlier on the right side of the boxplot will be removed .



Answer the following three questions based on the histogram above.

1. Where would the mode of this dataset lie?

The mode of the data set will be less than median(mode<7) in the right skewed data.

1. Comment on the skewness of the dataset.

The data is asymmetrical and right skewed.

1. Suppose that the above histogram and the boxplot in question 2 are plotted for the same dataset. Explain how these graphs complement each other in providing information about any dataset.

The boxplot gives information about outliers and percentiles of the probability distribution and that is confirmed with histogram skewness, kurtosis ,where the mean, median and mode can lie.

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:**

one in 200 long-distance telephone calls is misdirected

* probability of call misdirecting p = 1/200
* Probability of call not Misdirecting = 1 - 1/200 = 199/200

Number of Calls = 5

P(x) = ⁿCₓpˣqⁿ⁻ˣ

n = 5

p = 1/200

q = 199/200

at least one in five attempted telephone calls reaches the wrong number

= 1 - none of the call reaches the wrong number

= 1 - P (0)

= 1   - 5C₀(1/200) ⁰(199/200)⁵⁻⁰

= 1 - (199/200)⁵

= 0.02475

1. Returns on a certain business venture, to the nearest $1,000, are known to follow the following probability distribution

|  |  |  |
| --- | --- | --- |
| 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 |

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

The most likely monetary outcome of the business venture is $2000 as it has maximum probability = 0.3

1. Is the venture likely to be successful? Explain

E(x)=∑x\*p(x)=$800.The venture is likely to be successful as expected value is $800.

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

The long-term average earning of business venture = $800

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

Std deviation=

=784000+324000+128000+8000+432000+484000=$1469.69

Standard deviation is a measure of the risk that an investment will fluctuate from its expected return. The smaller an investment's standard deviation, the less volatile it is. The larger the standard deviation, the more dispersed those returns are and thus the riskier the investment is.