**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 = 33.27

standard deviation = 16.37

variance = 268.0035

outlier = 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.

Ans: IQR = Q3 – Q1 = 12-5

= 7 (This means that the of values of variable ‘X’ when arranged in ascending order the middle 50% will lie within a range of 7.)

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

Ans: It is sightly 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: As it considered an outlier when the point is 25 it will not affect the box plot, also the new value since it would lie outside the 1st quantile it wouldn’t affect the box plot.



Answer the following three questions based on the histogram above.

1. Where would the mode of this dataset lie?

Ans: It will lie in 4 and 8.

1. Comment on the skewness of the dataset.

Ans: It is right 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: Both are right skewed and when used together would confirm the skewedness and presence of outliers and how many are present in data.

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 one in 200 long-distance telephone calls is misdirected then,

P(misdirecting) = p = 1/200

Therefore P(not misdirecting) = q = 1 - P(misdirecting) = 1 – 1/200

= 199/200

So, for probability that at least one in five attempted telephone calls reaches the wrong number = 1 – P(0 calls misdirected in 5 attempts) =1 - nCxpxqn-x  (n = 5, x = 0)

= 1 - 5C0p0q5-0

= 1 – 1 x 1 x q5-0

= 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) |
| -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: Most likely monetary outcome would be 2000 as the one event with highest probability is P(x = 2000) = 0.3

1. Is the venture likely to be successful? Explain

Ans: To be considered successful the venture must make a profit so,

P(success) = P(1000) + P(2000) + P(3000) = 0.2 + 0.3 + 0.1 = 0.6

P(failure) = 1 - P(success) = 1 – 0.6

= 0.4

As P(success) > P(failure) we can say that the venture will be successful.

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

Ans: Long-term average earning will be = -2000\*0.1 + (-1000)\*0.1 + 0 + 1000\*0.2 + 2000\*0.3 + 3000\*0.1

= 800 (As it certain events will lead to loss and other to profit depending on its likelihood of occurrence which is given by probability of the respective event.)

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

Ans: We can measure the risk by calculating the probability of failure i.e., events that create loss and events that don’t make profit:

As we have calculated P(failure) = 0.4 or 40% is the chance of failure.