**Topics: Descriptive Statistics and Probability**

* 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.

* What is inter-quartile range of this dataset? (please approximate the numbers) In one line, explain what this value implies.

Ans : IQR = 12-5 = 7 , This represent the range which contains 50% of the data points.

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

Ans : Right Skewed

* 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: 2.5 will be not considered an outlier. The boxplot will start from 0 and end at 20 in representation.



Answer the following three questions based on the histogram above.

* Where would the mode of this dataset lie?

Ans : Mode lies between 4 to 8

* Comment on the skewness of the dataset.

Ans: Right Skewed. Positive

* 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 : Median in boxplot and mode in histogram.

Histogram provides the frequency distribution so we can see how many times each data point is occurring.

However boxplot provides the quantile distribution . i.e 50% data lies between 5 and 12.

Boxplot provide whisker length to identify outliers, no informaton from histogram. 25 may be an outlier.

* 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 : 1 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

n = 5

p = 1/200

q = 199/200

At least one in fve atempted 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

The probability that at least one in five attempted telephone calls reaches the wrong number= 0.02475

* 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 |

* What is the most likely monetary outcome of the business venture?

Ans : Max probability is 0.3 for x= 2000. So most likely outcome is 2000.

* Is the venture likely to be successful? Explain

Ans : P(x>0) = 0.6, implies there is a 60% chance that the venture would yield profits or greater than expected returns. P(Incurring losses) is only 0.2.

So the venture is likely to be successful.

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

Ans : Weighted average = x\*P(x) = 800. This means the average expected earnings over a longperiod of time would be 800(including all losses and gains over the period of time)

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

Ans : P(loss) = P(x= -2000)+P(x=-1000)=0.2. So the risk associated with this venture is 20%