**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.

(i)ans: inter quartile range = upper quartile –lower quartile

i.e, uq=12(approximately) and lq=5

=12-5

=7

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

(ii)ans: the skewness of dataset 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?

(iii)ans:

* The new inter quartile range is 0.07
* It is positively skewed
* The box plot values will be affected



Answer the following three questions based on the histogram above.

1. Where would the mode of this dataset lie?

(i)ans: The mode of this dataset lie is 20

1. Comment on the skewness of the dataset.

(ii)ans: The most of data lied left so it is positively skewed and the out lier is 25

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.

(iii)ans: the histogram and box plot both are right skewed and both has outliers where in box

plot median can see and in histogram can see mode.

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.)

4ans: one in 200 long-distance telephone calls is misdirected

Then probability=p=1/200

Not misdirected=q=1-1/200=199/200

For five misdirected n=5

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?

(i): Here the highest probability for 2000

1. Is the venture likely to be successful? Explain

(ii): Yes, because the total earnings of the venture is positive in value i.e 800 and

highest probability of earning is 2000.

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

(iii): average earnings=x\*p(x)

average earnings=0.1\*(-2000)+0.1\*(-1000)+0.2(0)+0.2\*(1000)+0.3(2000)+0.1(3000)

=800

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

(iv): stats.norm.ppf(0.80)= 0.8416212335729143