**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% |

1) new.mean()

=33.27133333333333%

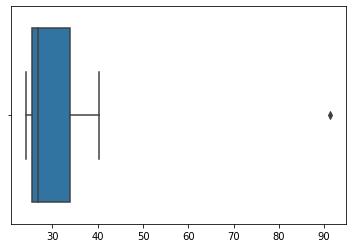
2) new.var()

=16.945400921222028%

3) new.std()

= 287.1466123809524%

Morgan Stanley is an Outlier of 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:- Inter-quartile range is 12-5= 7.

Viscous 0 to 19.

Outlier is 1.

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

ANS:- right skewness

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:- 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.

1. Where would the mode of this dataset lie?

ANS:- the mode of this dataset lie between 4 – 8

1. Comment on the skewness of the dataset.

ANS:- positive skewness or right skewness.

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:-

* 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, 50% data lies between 5 and 12.
* Boxplot provides whisker length to identify outliers, no information from histogram. We can only guess looking at the gap that 25 may be an outlier.

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:-

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

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

**probability that at least one in five attempted telephone calls reaches the wrong number = 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 of the business venture  is 2000

as it has maximum probability = 0.3

1. Is the venture likely to be successful? Explain

ANS:- p(x>0)=0.6

p(x=1000)+p(x=2000)+p(x=3000)]

= 0.2+0.3+0.1

= 0.6

There is a most chances 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.

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

ANS:- Expected value= ∑ E(X)P(X)

= [(0.1)(-2000)+(0.1)(-1000)+(0.2)(0)+(0.2)(1000)+(0.3)(2000)+(0.1)(3000)]

=800

Weight average = x\*p(x)= 800. This means the average expected earning over a long period of time would be 800.

1. 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%.