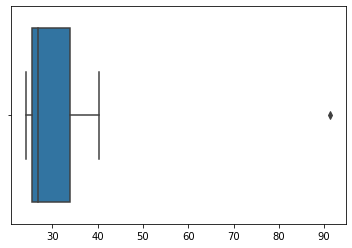
**Topics: Descriptive Statistics and Probability**

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% |



Ans) Morgan Stanley with 91.36% measure is the outlier in the data.

Mean= 33.2713

Standard deviation = 16.945

Variance = 287.146



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.
2. What can we say about the skewness of this dataset?
3. 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) i) Q1 =5,Q3 =12

IQR = 12-5 = 7

IQR is the second quartile range and 50% of the data points lie within that range

ii) Positively skewed

iii) If a data point of value 25 is actually 2.5,then thee mean and median of the data may change.There will be no outlier and there may be shift in data



Answer the following three questions based on the histogram above.

1. Where would the mode of this dataset lie?
2. Comment on the skewness of the dataset.
3. 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) i)The mode can be between 3-8 as the density/peak of the distribution is maximum in this region.

ii) Positively skewed

iii) Both the graphs show a positive skewness and outlier of value 25

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) Probability of call misdirecting = 1/200

Probability of call not misdirecting =1-1/200=199/200

Number of calls = 5

P(x) = ⁿCₓpˣqⁿ⁻ˣ

X=0

1-p(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?
2. Is the venture likely to be successful? Explain
3. What is the long-term average earning of business ventures of this kind? Explain
4. What is the good measure of the risk involved in a venture of this kind? Compute this measure

Ans) i)$2000 is the most likely monetary outcome of the business venture as it has high probability of 0.3

ii)0.3+0.2+0.1 = 0.6\*100=60% is the probability for positive returns.Hence the enture is likely to be successful.

Iii)(-2000\*0.1)+(-1000\*0.1)+(0\*0.2)+(1000\*0.2)+(2000\*0.3)+(3000\*0.1) = 800

iv)Variance and standard deviation is a good measure.

Var(x) = E(x^2) – E(x)^2

E(x^2) = 2800000

E(x)^2 = 800^2

Var = 2160000

SD = sqrt(var) = 1470$

As variability is high risk is high