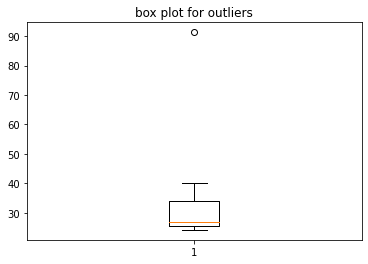
**Topics: Descriptive Statistics and Probability**

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: Outlier:91.36(Morgan Stanley)

Mean:33.27

Standard deviation:0.163

variance:0.0268



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?

🡪Answer: (i) IQR =12-5= 7

The IQR consist of 50% of data and this value indicates that the IQR lies between 5 and 12(approx.)

(ii) The data is right or positively skewed

(iii) Now, the median is effected by this wrong assumption and the data alignment changes as there is a new point is added in between



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.

🡪Answer: (i)The mode of the data lies between the 4 and 8 as most of the data in that range is repeated.

(ii)The data is right skewed or positive skewed from the histogram shown above

(iii)If they are plotted from same data, it results in same outlier and median

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.)

🡪Answer:

P(error) = 1/200

P(E) = 1-p(error)=1-1/200=199/200

Now,

For 5 attempts error probability is given by

P(E5) = 1-[(199/200)\* (199/200)\* (199/200)\* (199/200)\* (199/200)]

= 1-[0.005\*0.005\*0.005\*0.005\*0.005]

= 0.25

“The probability of getting one wrong call in five wrong calls is 0.25”

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?

🡪Answer: the most likely monetary outcome of the business venture is 2000

1. Is the venture likely to be successful? Explain

🡪Answer: The business venture is likely to be successful as the weighted average is positive

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

🡪Answer: The long term average earning of the business venture is 800

|  |  |  |
| --- | --- | --- |
| **x** | **P(x)** | **x\*p(x)** |
| -2,000 | 0.1 | -200 |
| -1,000 | 0.1 | -100 |
| 0 | 0.2 | 0 |
| 1000 | 0.2 | 200 |
| 2000 | 0.3 | 600 |
| 3000 | 0.1 | 300 |
|  | Sum(x\*p(x))= | 800 |

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

🡪

|  |  |  |  |
| --- | --- | --- | --- |
| **x** | **P(x)** | **x\*p(x)** | **(x-**µ)^2\*p(x) |
| -2000 | 0.1 | -200 | 400000 |
| -1000 | 0.1 | -100 | 100000 |
| 0 | 0.2 | 0 | 0 |
| 1000 | 0.2 | 200 | 200000 |
| 2000 | 0.3 | 600 | 1200000 |
| 3000 | 0.1 | 300 | 900000 |
|  | Weighted average: | 800 | 2800000 |
|  |  |  | 1673.320053 |

🡪The good measure is the standard deviation and the standard deviation for this problem is 1673.32