**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%** |

**Solution:**

import pandas as pd

import numpy as np

import matplotlib.pyplot as plt

data=(24.23,25.53,25.41,24.14,29.62,28.25,25.1,24.39,40.26,32.95,91.36,25.99,39.42,26.71,35.00)

df=pd.DataFrame(data)

df.mean()

df.var()

df.std()

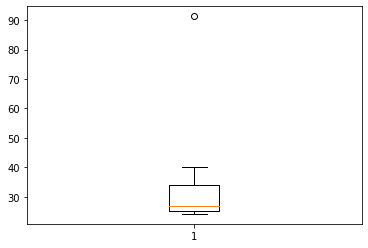
box\_plot=plt.boxplot(df[0])

μ = mean= 33.224

σ = Standard deviation= 16.968707

σ2 = Variance = 287.937011

**Boxplot:**



Here we can observe that there is one outlier in the dada.

**2.**



**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 :**

1. Inter- quartile range = Q3-Q1

= 12-5

=7

Interquartile range suggest us how spread out the middle 50% of our data is.

1. The Q2 shifted towards left side(Q1) .So we can say that it is positively skewed.
2. As we see that the range of data is 0 to 20 . If 2.5 point will be added in the data then there will be no outlier in the data.

**3.**



**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:**

1. Mode lies between 4 and 7
2. It is positively skewed.
3. Box plot shows outlier in the dataset .

Boxplot gives us median and Histogram gives us mode.

From both we get information about skewness.

**4.**

**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.)**

**Solution:**

No. of attempts n = 5

probability of call is misdirected =1/200

Rcode:

>n=5

>p=1/200

> pro=dbinom(0,n,p);pro # p(x=0)

[1] 0.9752488

P(x>=1)= 1- P(x=0)

= 0.02475125

Therefore probability that at least one in five attempted telephone calls reaches the wrong number is 0.02475.

**5.** **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 :** The most likely monetary outcome of the business venture is $2000

1. **Is the venture likely to be successful? Explain**

**Ans**: Yes , Because there are higher chances of positive returns. As we see in table 0.3+0.2+0.1 = 0.6\*100 = 60%

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

**Ans** : long-term average earning of business ventures = 800 $

by , x\*P(x) = (-2000\*0.1)+(-1000\*0.1)+(0\*0.2)+(1000\*0.2)+(2000 \*0.3)+(3000\*0.1)

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

**Ans:** large value in the standard deviation of the variable x shows that there is highriskinvolved in this venture. Var = 3.500000

Sd = 1870.83

