**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.

**Ans.** Based on the box-plot of variable X

X – is moving towards the Right skewed data (or) Positively skewed data .

It repreents the range in which 50% of the data sets lie.

(i)

IQR stands for – “Inter Quartile Range”

Inter Quartile Range= Q3-Q1  
 Q3 is the last value in the boxplot =12

Q2 is the Median =7

Q1 is the first value in the boxplot =5

Here the outlier is 25

OUTPUT:

Inter quartile range of this dataset is between =12 - 5 = 7

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

**Ans.**

Based on the box-plot of variable X

Output:

X – is moving towards the Right skewed data (or) Positively skewed data of this dataset

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.** In that case there would be no outliers, and it might have affected in the values of mean and median slightly.The boxplot might move towards right slightly



Answer the following three questions based on the histogram above.

1. Where would the mode of this dataset lie?

**Ans.** Between 4-8 (most frequent occurring value)

1. Comment on the skewness of the dataset.

**Ans.** It is a Positively skewed data

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.** By comparing both of them it is very clear that the data is “Positively skewed”

It would help us finding mean, mode values

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 getting misdirected= 1/200

Probability of call not getting misdirected = 1-(1/200) =199/200

Number of phone calls attempted =5

Probability atleast one in 5 attempts call reaches wrong number

= 1-(199/200)\*5

OUTPUT

=0.025

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.** Here the highest probability is for 2000

1. Is the venture likely to be successful? Explain

**Ans.** Yes ,because the total earnings of the venture and highest probability of earnings is 2000. P(x>0) = 0.6, implies there is a 60% chance 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.** Income(x\*(P(x))

X= -2000

P(x) =0.1

(x\*(P(x))= -2000\*0.1 =-200

X= -1000

P(x) =0.1

(x\*(P(x))= -1000\*0.1 =-100

X= 0

P(x) =0.2

(x\*(P(x))= 0\*0.2 = 0

X= 1000

P(x) =0.2

(x\*(P(x))= 1000\*0.2 = 200

X= 2000

P(x) =0.3

(x\*(P(x))= 2000\*0.3 = 600

X= 3000

P(x) =0.1

(x\*(P(x))= 3000\*0.1 = 300

OUTPUT

TOTAL =800

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

**Ans. Ans.** Income(x\*(P(x))

X= -2000

P(x) =0.1

(x\*(P(x))= -2000\*0.1 =-200

X= -1000

P(x) =0.1

(x\*(P(x))= -1000\*0.1 =-100

X= 0

P(x) =0.2

(x\*(P(x))= 0\*0.2 = 0

X= 1000

P(x) =0.2

(x\*(P(x))= 1000\*0.2 = 200

X= 2000

P(x) =0.3

(x\*(P(x))= 2000\*0.3 = 600

X= 3000

P(x) =0.1

(x\*(P(x))= 3000\*0.1 = 300

P(loss) = P(x= -2000)+P(x=-1000)=0.2. So the risk associated with this venture is 20%.