**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% |

Mean: 800.0

Standard Deviation: 16.370812590976932

Variance: 268.00350488888887

Outliers: Company Measure\_X = 10 Morgan Stanley 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.

IQR = Q3-Q1

Where Q3=12.5 and Q1=5

IQR = 12.5-5

IQR = 7.5

So range is between 5 – 12.5[Data lies in between this]

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

:= Nature of the skewness is Right skewed

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?

:= The median value will remain same, but the interquartile will slightly changes and importantly there will be no presence of outliers.box plot will exist between 0 and 5



Answer the following three questions based on the histogram above.

1. Where would the mode of this dataset lie?

:= The mode of the dataset lie in the range of 4 - 10

1. Comment on the skewness of the dataset.

:= Nature of the skewness is positively skewed(Right skewed)

1. Suppose 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.

:= there is no such changes outliers remains same, median lies in between the data set

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.

:= Probability (P) = 1/200

Number of attempts (n) = 5

p(x) = nC x P^x q^(n-x)

P(x>=1) = p(x=1) + p(x=2) + p(x=3) +p(x=4) + P(x=5)

= 1 -p(0)

\*P(x=0) =5C\_0 \*(1/200)^0\* (199/200)^5

=(199/200)^5

\*P(x>=1) =1-0.9724

=0.02475124687

Probability of at least one success in Five attempts = 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?

:= it’s the highest probability of the business venture = $2000 due to its highest probability[p(x)]=0.3.

1. Is the venture likely to be successful? Explain

:= When we are finding the success ratio we are likely to use the positive outcomes,ie:- 0.2+0.2+0.3+0.1

P(s)=0.8 or 80% probability of being successful in the business.

Therefore the business venture is successful with 80 % profit.

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

:= average or expected value (μ) = ∑*i*​*P*(*xi*​)⋅*xi*​

Expected value = (-2,000)\*(0.1)+(-1,000)\*(0.1)+(0)\*(0.2)+(1000)\*(0.2)+(2000)\*(0.3)

+(3000)\*(0.1)

Expected value = -200-100+0+200+600+300

Expected value = 800

Therefore the long-term average earnings is expected to be $800 which is nearest to the $1000.so it’s a successful business in long term.

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

:= Standard deviation = SQRT(E(x^2) – E(x)^2)

=SQRT(2800000–(800)^ 2)

where Standard Deviation (σ): 1469.6938456699068.

varience =mean\*square diff

varience = 1469.69

i.e = Higher the Standard deviation higher the value or ratio of Risk.