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**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 - Mean (μ): 33.27

Standard Deviation (σ): 16.37

Variance (σ^2): 268.00

By observation we can consider

Morgan stanley - 91.36% as the outlier



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 – The IQR approx. = Q3(approx.)-Q1

=12 -5

=7

This implies the 50% of the data with mean median and range

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

The distribution 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?

ANS – The outlier won’t be the outlier anymore and it will affect the mean with the range adjustment



Answer the following three questions based on the histogram above.

1. Where would the mode of this dataset lie?

Ans: The mode of this data set lie in between 5 to 10 and approximately between 4 to 8 .

1. Comment on the skewness of the dataset.

Ans: Right-Skewed. Mean>Median>Mode

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 – we can conclude that the data is right skewed and the median and mode lie between the range 5 -12

most precisely the mode will lie in the range between 5- 8

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: IF 1 in 200 long-distance telephone calls are getting misdirected.  
probability of call misdirecting = 1/200 Probability of call not Misdirecting

= 1-1/200

= 199/200

The probability for at least one in five attempted telephone calls reaches the wrong number of Calls = 5 n

= 5 p

= 1/200 q

= 199/200

P(x) = at least one in five attempted telephone calls reaches the wrong number

P(x) = ⁿCₓ pˣ qⁿ⁻ˣ P(x)

= (nCx) (p^x) (q^n-x) # nCr

= n! / r! \* (n - r)! P(1)

= (5C1) (1/200)^1 (199/200)^5-1 P(1)

= 0.0245037

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**- To find the most likely monetary outcome of the business venture, we look for the outcome with the highest probability. In this case, the outcome with the highest probability is $2,000, which has a probability of 0.3.

1. Is the venture likely to be successful? Explain

**ANS**- YES , based on the given probabilities, the venture has a 0.2 + 0.3 +0.1 = 0.6 probability of achieving a positive return (earnings of $0 or more) which is 60%. Also the probabilities of getting a failure are 0.1 + 0.1 = 0.2 which is 20%

Therefore, it is likely to be successful in this sense.

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

**ANS**- *E*(*X*)=(−2000×0.1)+(−1000×0.1)+(0×0.2)+(1000×0.2)+(2000×0.3)+(3000×0.1)

= -200+(-100)+0+200+600+300

= 800

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

**ANS**- The good measure of the risk involved in a venture of this type depends on the variability in the distribution

**Greater variance tends to greater risk**

Var(X) = E(X2) - (E(X))2

=1870$