ACADGILD

SESSION 8: Exploratory Data Analytics

Assignment 3

PROBLEM STATEMENT

1. A recent national study showed that approximately 44.7% of college students have used Wikipedia as a source in at least one of their term papers. Let X equal the number of students in a random sample of size n = 31 who have used Wikipedia as a source.

a. Find the probability that X is equal to 17
b. Find the probability that X is at most 13
c. Find the probability that X is bigger than 11.
d. Find the probability that X is at least 15.
e. Find the probability that X is between 16 and 19, inclusive

SOLUTION

The R-script for the given problem is as follows:

```
# a. Find the probability that X is equal to 17 dbinom(17,
31, 0.447)

# b. Find the probability that X is at most 13
pbinom(13, 31, 0.447)

# c. Find the probability that X is bigger than 11. pbinom(11, 31,
0.447, lower.tail = F)

# d. Find the probability that X is at least 15.
pbinom(14, 31, 0.447, lower.tail = F)

# e. Find the probability that X is between 16 and 19, inclusive
sum(dbinom(16:19, 31, 0.447))
diff(pbinom(c(19,15), 31, 0.447, lower.tail = FALSE))
```

The output of the R-Script (from Console window) is given as follows:

```
6.  # a. Find the probability that X is equal to 17
7.  dbinom(17, 31, 0.447)
[1] 0.07532248

1.  # b. Find the probability that X is at most 13
2.  pbinom(13, 31, 0.447)
[1] 0.451357
> # c. Find the probability that X is bigger than 11.
> pbinom(11, 31, 0.447, lower.tail = F)
[1] 0.8020339

> # d. Find the probability that X is at least 15.
> pbinom(14, 31, 0.447, lower.tail = F)
[1] 0.406024

> # e. Find the probability that X is between 16 and 19, inclusive
> sum(dbinom(16:19, 31, 0.447))
[1] 0.2544758
> diff(pbinom(c(19,15), 31, 0.447, lower.tail =
FALSE)) [1] 0.2544758
```

Conclusion/Interpretation:

a) 0.07532248 is the probability that x is equal to 17
b) 0.451357 is the probability that x is at most 13
c) 0.8020339 is the probability that x is bigger than 11
d) 0.406024 is the probability that x is at least 15
e) 0.2544758 is the probability between 16 and 19 , inclusive