Question

A sample of students from an introductory marketing class was polled regarding the number of hours they spent studying for the last statistics exam. All students anonymously submitted the number of hours on a 3 by 5 card. There were 24 individuals in the one section of the course polled. The data was used to make inferences regarding the other students taking the course. Their data are below:

4.5 22 7 14.5 9 9 3.5 8 11 7.5 18 20 7.5 9 1 0.5 15 19 2.5 5 9 8.5 14 20 8

A) compute the mean number of hours the marketing students spent studying for the last statistics exam

B) compute a 99% confidence interval for hours spent studying for the last statistics exam

C) compute the proportion of marketing students who spent less then 10 hour a studying for the last statistics exam

D) compute a 98% confidence interval of the true population proportion of marketing students who spent less than 10 hours studying for the last statistics exam.

Solution

$$\sum x = 262, \sum x^2 = 3581$$

A) The mean number of hours the marketing students spent studying for the last statistics exam is

$$\bar{X} = \frac{\sum x}{n} = \frac{262}{24} = 10.92$$

B)

$$s = \sqrt{\frac{\sum x^2 - \frac{(\sum x)^2}{n}}{n-1}} = \sqrt{\frac{3581 - \frac{(262)^2}{24}}{24-1}} = 5.60$$

$$CI = \left(\bar{X} - t^* \frac{s}{\sqrt{n}}; \bar{X} + t^* \frac{s}{\sqrt{n}}\right),$$

where $t^* = 2.808$ for 99% confidence level and $24 - 1 = 23$ degrees of freedom.

The 99% confidence interval for hours spent studying for the last statistics exam is

$$CI = \left(10.92 - 2.808\frac{5.60}{\sqrt{24}}; 10.92 + 2.808\frac{5.60}{\sqrt{24}}\right) = (7.71; 14.13)$$

C)

$$p = \frac{k}{n} = \frac{14}{24} = 0.4833.$$

D)

$$CI = \left(p - t^* \sqrt{\frac{p(1-p)}{n}} ; p - t^* \sqrt{\frac{p(1-p)}{n}} \right),$$

where $t^* = 2.500$ for 98% confidence level and $24 - 1 = 23$ degrees of freedom.

$$CI = \left(0.4833 - 2.500 \sqrt{\frac{0.4833(1-0.4833)}{24}} ; 0.4833 + 2.500 \sqrt{\frac{0.4833(1-0.4833)}{24}} \right) = (0.2283; 0.7383).$$

Answer: A) 10.92; **B)** (7.71; 14.13); **C)** 0.4833; **D)** (0.2283; 0.7383).