Answer on Question #67861 – Math – Statistics and Probability

Question

a) A sample of 25 items is selected from a very large shipment. It is found to have a mean weight of 310 gm and standard deviation equal to 9 gm. State and compute the 95% confidence limits for the population mean weight.

Solution

a) $95\%\ CI = \left(\bar{x} - t_{0.025,24}\frac{s}{\sqrt{n}},\ \bar{x} + t_{0.025,24}\frac{s}{\sqrt{n}}\right) =$

$$= \left(310 - 2.064\frac{9}{\sqrt{25}}, \qquad 310 + 2.064\frac{9}{\sqrt{25}}\right) = (306.2848, 313.7152).$$

Question

b) In a University, 20% of all students are graduates and 80% are undergraduates. The probability that a graduate student is married is 0.5 and the probability that an undergraduate student is married is 0.1. One student is selected at random. What is the probability that (i) he/she is married (ii) the student is a graduate if he/she is found to be married?

Solution

b)

(i) $P(A) = P(H1) * P(A|H1) + P(H2) * P(A|H2) = 0.2 * 0.5 + 0.8 * 0.1 = 0.18.$

(ii) $P(H1|A) = \frac{P(A|H1)*P(H1)}{P(A)} = \frac{0.2*0.5}{0.2*0.5+0.8*0.1} = 0.5556.$