Answer on Question #60548 – Math – Statistics and Probability

Question

Based on studies conducted in various regions across the country, the average cost of pumpkins for consumers is $3.18 per kg.

From a random sample of 15 farmer's markets in the Montreal-area you determine that the average price for pumpkins is $4.25 per kg with a standard deviation of $1.90 per kg.

a) Determine the minimum sample size necessary to construct a 95% confidence interval with maximal error of E = 0.5 for the mean price of pumpkins.

b) Construct a 95% confidence interval for the average price of pumpkins in the Montreal-area and determine if it differs significantly from that of the rest of the country

Solution

a) $E = t_{crit}\frac{s}{\sqrt{n}} \rightarrow \ n = \left(\frac{t_{crit}s}{E}\right)^2 = \left(\frac{2.145*1.9}{0.5}\right)^2 \approx 66.$

b) $CI = \left(\bar{x} - t_{crit}\frac{s}{\sqrt{n}}\ , \bar{x} + t_{crit}\frac{s}{\sqrt{n}}\right) = \left(4.25 - 2.145\frac{1.9}{\sqrt{15}}\ ,\ 4.25 + 2.145\frac{1.9}{\sqrt{15}}\right) =$

$= (3.20,\ 5.30).$

Average cost of pumpkin ($3.18) does not fall into confidence interval, therefore we can conclude that the average price of pumpkins in the Montreal-area differs significantly from that of the rest of the country.

Answer: a) 6; **b)** $(3.20,\ 5.30)$.