Answer on Question #60549 – 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.

d) Construct a 98% confidence interval for the average price of pumpkins in the Montreal-area if the statistics remained unchanged despite the fact that 20 more markets were sampled and determine if it differs significantly from that of the rest of the country.

e) Construct a 95% confidence interval for the average price of pumpkins in the Montreal-area if a new sample of 15 pumpkins yields a sample mean of \$4.52 per kg. and a standard deviation of \$2.50 per kg. Determine if it differs significantly from that of the rest of the country.

f) Give two reasons that explain the difference in the length of the confidence interval you calculated in part c and in part d.

Solution

d) a 98% confidence interval for the average price of pumpkins in the Montreal-area is

$$CI = \left(\bar{x} - t_{crit}\frac{s}{\sqrt{n}}\,, \bar{x} + t_{crit}\frac{s}{\sqrt{n}}\right) = \left(4.25 - 2.441\frac{1.9}{\sqrt{35}}\,,\ 4.25 + 2.441\frac{1.9}{\sqrt{35}}\right) =$$

$$= (3.47,\ 5.03).$$

Average cost of pumpkin (\$3.18) does not fall into the 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.

e) a 95% confidence interval for the average price of pumpkins in the Montreal-area is

$$CI = \left(\bar{x} - t_{crit}\frac{s}{\sqrt{n}}\ , \bar{x} + t_{crit}\frac{s}{\sqrt{n}}\right) = \left(4.52 - 2.145\frac{2.5}{\sqrt{15}}\ ,\ 4.52 + 2.145\frac{2.5}{\sqrt{15}}\right) =$$

$$= (3.14,\ 5.90).$$

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

f) The difference can be explained by the changing in sample size and confidence level.

Answer:

d) $(3.47,\ 5.03)$; **e)** $(3.14,\ 5.90)$; **f)** the difference can be explained by the changing in sample size and confidence level.