Aughdon Breslin, MA331 Assignment 1, Professor Rossi, 7/21/21

2) Construct a 99% confidence interval for the mean daily intake of dairy products

$n = 50 \geq 30 \rightarrow CLT \rightarrow \sigma \cong s$

$\alpha = 1 - 0.99 = .01 \rightarrow z = 2.58$ where z = $z_{\alpha/2}$

$SE = \sigma/\sqrt{n} \rightarrow s/\sqrt{n} = 35/\sqrt{50} \cong 4.95$

$99\%CI = xbar \pm z * SE = 756 \pm 2.58 * 4.95 = [743.229, 768.771]$

4) Estimating Difference Between Two Binomial Distributions

$n_1 = 50$, $n_2 = 100$,

$p_1 = .76$, $q_1 = 1 - .76 = .24$, $p_2 = .65$, $q_2 = 1 - .65 = .35$

1) Estimate the difference in the true proportions favoring the bond proposal with a 99% confidence interval.

   $\alpha = 1 - 0.99 = .01 \rightarrow z = 2.58$

   $(p1 - p2) \pm \sqrt{(p1q1/n1) + (p2q2/n2)} = (.76 - .65) \pm \sqrt{((.76)(.24)/50) + ((.65)(.35)/100)} = .1$

   $= [0.033, 0.187]$

2) If both samples were pooled into one sample of size n = 150, with 103 in favor of the proposal, provide a point estimate of the proportion of city residents who will vote for the bond proposal. What is the margin of error?

   $p = 103/150 = .687$

   99%CI means z = 2.58

   $ME = z * \sqrt{pq/n} = 2.58 * \sqrt{(0.687)(.313)/150} = .038$

5) n = 40, mean = 10.3% = .103, stdev = .31% = .0031, Find 95% upper confidence bound where z = $z_{\alpha}$

$\alpha = 1 - 0.95 = .05 \rightarrow z_{.05} = 1.64$

$SE = \sigma/\sqrt{n} = .0031/\sqrt{40} \cong 0.0005$

$UCB = mean + z * SE = .103 + 1.64 * .0005 = 0.10382$