Math 153 - Quiz 10

November 15, 2012

Name key

Score _____

Show all work to receive full credit. Supply explanations when necessary.

1. (4 points) M&M plain candies have a mean weight of 0.8565 grams and a standard deviation of 0.0518 grams.

   (a) If one M&M plain candy is randomly selected, find the probability that it weighs more than 0.8535 grams.

   $P(x > 0.8535) = \text{normalcdf}(0.8535, 9999, 0.8565, 0.0518)$

   $= 0.52309 \approx 52.3\%$

   (b) If 465 M&M plain candies are randomly selected, find the probability that their mean weight is more than 0.8535 grams.

   $S = \frac{0.0518}{\sqrt{465}} \approx 0.0024$

   $P(\bar{x} > 0.8535) = \text{normalcdf}(0.8535, 9999, 0.8565, 0.0024)$

   $= 0.894144 \approx 89.4\%$

2. (6 points) In a survey of 1002 people, 701 said they voted in the recent presidential election.

   (a) Find a 99% confidence interval estimate for the proportion of people who say they voted.

   CALCULATOR
   1-PropZInt
   $x = 701$
   $n = 1002$
   C-LEVEL 0.99

   $(0.6623, 0.73691)$

   (b) Voting records show that 61% of voters actually did vote. Are the survey results consistent with the actual voter turnout? Explain.

   NO, 0.61 IS NOT IN OUR 99% C.I.

   (c) Given the survey results, estimate the sample size required to have a margin of error of 2.5%.

   $N = \frac{(z_{\alpha/2})^2 \hat{p}\hat{q}}{E^2} = \frac{(2.5758)^2 (0.6996)(0.3004)}{0.025^2}$

   $\alpha = 0.01$

   $\alpha/2 = 0.005$

   $z_{\alpha/2} = 2.5758$

   $\hat{p} = \frac{701}{1002} = 0.6996$

   $\hat{q} = \frac{301}{1002} = 0.3004$

   ≈ 2231