Math 148 Quiz Eight Version D

Name:

Answer the following questions:

1. (3 points) For the following, write out either 'True' or 'False'

(a) A sample is part of the population.
True
(b) A statistic is a variable which can be computed from the population.
False
(c) Simple random sampling means drawing at random with replacement.
False
2. Binghamton University has 16,000 students of whom 4,000 are younger than 20. The registrar draws a simple random sample of 1,600 students.

(a) Find the expected value and SE for the number of students in the sample who are younger than 20.
(b) Find the expected value and SE for the percentage of students in the sample who are younger than 20.
(c) Use the normal approximation to estimate the chance that more than 22% of the students in the sample are younger than 20.
(a)
EV for # = # of draws × Average of 0-1 box = 1600 × 0.25 = 400.

SE for # = $\sqrt{\#ofdraws}\times$ SD of 0-1 box = $\sqrt{1600} \times (1-0) \times \sqrt{\frac{4000}{16000} \times \frac{12000}{16000}} = 17.32$

(b)
EV for % = EV for #/ # of draws = 400/1600 = 0.25=25%

SE for % = SE for #/ # of draws = 17.32/1600 = 1.0825%

(c)

$\frac{22\%-25\%}{1.0825\%} = -2.77$

The chance is 99.7%

3. In fall 2010, a university had 16,000 registered students. To estimate the percentage who were older than 21. A simple random sample of 400 students was drawn. It turned out that 200 of them were older than 21. Estimate the percentage of students at the university who were older than 21 in fall 2010. Find an 80% confidence interval for that percentage.

To estimate the population percentage, use sample percentage = 200/400 =50%

SE for % = SD of box/ sqrt of sample size = 0.5/ $\sqrt{400}$ = 2.5%

80% confidence interval for that percentage = $50\% \pm 1.3 \times 2.5\% = 50\% \pm 3.25\%$