DSE 210 Worksheet 9

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1. box 9 R marbles, 1 blue $n=900$ w/o replacement

$N(np, np(1-p))$ $N(900\times0.9, 900\times0.9(0.1))$ $N(810, 81)$

5. actual $=0.5=p$

a. poll 100 ppl

$$\sqrt{\frac{p(1-p)}{n}} = \sqrt{\frac{0.5(0.5)}{100}} = 0.05$$

b. poll 2500 ppl

$$\sqrt{\frac{0.5(0.5)}{2500}} = 0.01$$

9. What matters is the sample size, not the overall pop. size (n can be 1000).

11. $n=100$ w/replacement $\Sigma = 297$

a. est. the avg. # in the box $\mu = 2.97$

b. not enough information

DSE 210 Worksheet 10

1. No, this isn't shown because no values for population are given for 1960 & 1990 ∴ no stats/assumptions can be made

6. 10,000 tossings head 5,400x is the coin biased $p=0.5$

a. Null hypothesis: The coin is biased

Alternative hypothesis: The coin is not biased

b. $\mu = 10000\times0.5 = 5000$ $\text{stddev} = \sqrt{10000\times0.5\times0.5} = 50$

$$z = \frac{\text{observed} - \text{expected}}{\text{stddev}} = \frac{5400-5000}{50} = 8$$

c. $p << 0.01$ ∴ reject null hypothesis, the coin is not biased

8. A higher p-value allows you to accept the null hypothesis

10. $n=1000$ public $\overline{hrs}=12.2$ stddev $=10.5$ private $\overline{hrs}=9.2$ stddev $=9.9$

Is the difference btw. these 2 avgs due to chance?

Null hypothesis: The 2 are the same

Alternative: Due to chance

$$\sigma_1 = \frac{10.5}{\sqrt{1000}} \approx 0.33 \qquad \sigma_2 = \frac{9.9}{\sqrt{1000}} \approx 0.31 \qquad X_2 - X_1 = 0 \quad \mu = 0 \qquad \sigma = \sqrt{\sigma_1^2 + \sigma_2^2} = 0.453$$

$$Z = \frac{12.2-9.2}{0.453} = 6.62$$

$p << 0.01$ ∴ reject null hypothesis, the difference btw. these 2 averages is due to chance