SCCC 312 - Fall 2002 - Practice Final Answers

Part I:

1) **Median (because that way the few low GPAs don't change anything)**

2) **mean=(8+10+6+12)/4=36/4=9oz   median=(8+10)/2=9oz**

3) **-205.777+1057.37(0.285)=95.57**

4) **s=8.78666**

[Another good question: What percentage of the variation in win percentage is explained by the teams' batting averages? ***R-squared=58.8%*** *What would be wrong with predicting the wins for a team with an average of 0.300?* ***That would be extrapolating.*** *]*

5) $\frac{42}{50}\cdot\frac{41}{49}\cdot\frac{40}{48}\cdot\frac{39}{47}\cdot\frac{38}{46}\cdot\frac{37}{45}\approx 33\%$

6) $\left(\frac{42}{50}\right)^6 \approx 35\%$

7) **expected number = np =85(0.048) = 4.08   s.dev=sqrt(np(1-p))=sqrt(85*.048*(1-0.048))=1.97**

8) $\binom{85}{0}0.048^0(1-0.048)^{50}+\binom{85}{1}0.048^1(1-0.048)^{49}+\binom{85}{2}0.048^2(1-0.048)^{48}$

[Other good questions: Use the normal approximation to the binomial to find the probability that 8 or more jams will occur on an average day.

$$P[X\geq 8]=P[X\geq 7.5]=P\left[\frac{X-np}{\sqrt{np(1-p)}}\geq\frac{7.5-4.08}{1.97}\right]=P[Z\geq 1.736041]=0.5-0.4582=0.0418$$

What must you assume about the copier uses to do use the binomial? ***The copy uses are independent and the chance of jamming doesn't change throughout the day.****]*

9) population: **New born babies in the area of Northside Hospital in 2001**
sample: **20 randomly selected newborns from the population**
variable: **weight**
parameter: **average weight of all the newborns in the population**
statistic: **6.87 lbs**.

10) $\bar{x}\pm t_{\alpha/2}\frac{s}{\sqrt{n}}\Rightarrow 6.87\pm 2.09\frac{1.76}{\sqrt{20}}\Rightarrow 6.87\pm 0.82\Rightarrow(6.05,6.87)$

[Another good question: What assumption about the weights of newborns needs to be true in order for you to trust the confidence interval you formed in question 10? ***Normally distributed.*** *How would you check this?* ***Q-Q plot should look like a straight line.****]*

Part II:

1) **p=% of registered voters who support the senator** **H_0: p=0.55 (don't spend)** **H_A: p<0.55 (spend)**

2) **Type I error would mean the senator starts spending when he didn't want to. Type II error would mean the senator doesn't spend when he should.**

3) $z = \frac{\hat{p} - p}{\sqrt{\frac{p(1-p)}{n}}} = \frac{0.502 - 0.55}{\sqrt{\frac{0.55(1-0.55)}{1000}}} = -3.05108$ **This gives a p-value of 0.5-0.4989=0.0011.**

4) **Start spending because p-value is less than α!**

5) $t_{df} = 19 = \frac{\bar{x} - \mu}{s/\sqrt{n}} = \frac{10.4 - 8}{4.3/\sqrt{20}} = 2.496076$ **We compare this to 2.36 and reject the null hypothesis.**

6) As α increases you are **<u>more</u>** likely to commit a Type I error, but **<u>less</u>** likely to commit a Type II error.