Key

NAME_____ Honor _____

Exam 2

Answer each question. **Show your work**, even if you do most of the answer on a calculator you need to set up the problem and show me what you were using to get that answer. **Circle your final answer**. The honor code is in affect.

1. The daily amount of ice used by the sno-cone man is uniformly distributed between 6 and 10 pounds.

   a. Is this a continuous or discrete distribution?

   continious x = amount of ice

   b. The sno-cone man uses two freezers. If one breaks down, then he can only store 9.5 pounds of ice a day. What is the probability that he will run out of ice before the end of the day if he has a freezer break down?

   $P(x > 9.5) = \frac{10 - 9.5}{10 - 6} = .125$

   c. What is the probability that he will use exactly 9 pounds of ice on a given day?

   $P(x = 9) = 0$ b/c continuous

   d. What is the least amount of ice he needs to keep in order to insure that the probability of running out of ice is only .05? (both freezers are working now)

   $P(x > x_0) = .05$

   $\frac{10 - x_0}{10 - 6} = .05$

   $10 - x_0 = .2$

   $x = 9.8$

2. A recent survey showed that 63% of students at the University of Colorado – Bolder are binge drinkers. You decide to conduct a survey of your own and ask 30 CU students whether they are binge drinkers or not.

a. What is the probability that 20 students would say they are binge drinkers?

x = # of student that say yes $n = 30$ $p = .63$ $q = .37$

binomial $P(x=20) = \binom{30}{20}(.63)^{20}(.37)^{10}$

$30045015(.63)^{20}(.37)^{10} = .14$

b. What is the expected number of binge drinkers and the standard deviation from your survey of 30 students?

$E(x) = 30(.63) = 18.9$

$\sigma = \sqrt{30(.63)(.37)} = 2.64$

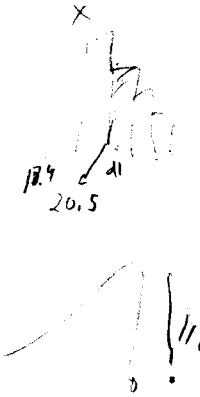
c. If you are interested in the probability of having 21 or more students say they are binge drinkers, would it be appropriate to use a normal approximation? (you must demonstrate why to get any credit)

$30(.63) = 18.9$

$30(.37) = 11.1$

both > 5 so you can approximate

d. What is the probability (or approximate probability if you can use the normal) that you will have 21 or more students say they are binge drinkers?



$P(x \geq 21) = P(x > 20.5)$

$= P\left(z > \frac{20.5 - 18.9}{2.64}\right)$

$= P(z > .606)$

$= .5 -$ (between)

between .2257 and .2291

so any answer between .2743 and .2709 will work

X = # of washers in a week

3. The average number of washers brought into the Maytag™ repair shop for a given week is 1.

   a. What is the distribution associated with the random variable defined as the number of washers brought in a week?

   poisson

   b. What is the random variable of part a's mean and standard deviation?

   $\mu = 1$

   $\sigma = 1$

   c. What is the probability that no washers will be brought in during a given week?

   $P(x=0) = \frac{1^0 e^{-1}}{0!} = .3678$

   d. You decide to go and sample 30 local Maytag™ repair shops, and record the sample average number of washers brought into those stores a week. What is the approximate probability distribution of your sample mean?

   $n = 30$

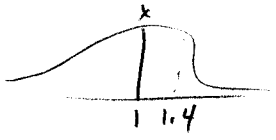
   $\bar{x} \sim Normal$

   e. What is the mean and standard error of your sample distribution?

   $\mu_{\bar{x}} = 1$

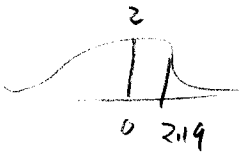
   $\sigma_{\bar{x}} = \frac{1}{\sqrt{30}}$

   f. What is the probability that in your sample of 30 stores, the average number of washers that come in during a week is greater than 1.4?



$P(\bar{x} > 1.4) = P\left(z > \frac{1.4 - 1}{\frac{1}{\sqrt{30}}}\right)$

$= P(z > 2.19)$



$= .5 - .4857$

$= .0143$