Second Exam

Write all answers in your blue book and show all work there. Return your exam in your blue book.

28 pts.
1) If \( \text{Prob}(A|B) = .5 \) and \( P(A \cap B) = .3 \) and \( \text{Prob}(A) = .9 \),
   a) What does \( P(B) =? \)
   b) What does \( P(B|A) =? \)
   c) Are \( A \) and \( B \) independent? Why?

18 pts.
2) Danger! There are fast ways and slow ways to solve here. Do the rest of the test and come back if your approach is taking a long time.
   a) Find the probability that 4 or more overweight individuals will be selected in a sample of 15, if \( p \), the probability of selection on each trial is .1.
   b) Find the probability that 4 or more overweight individuals will be selected in a sample of 15, if \( p \), the probability of selection on each trial is .45.

36 pts.
3) a) If \( X \) is distributed normally with \( \mu = 20 \) and \( \sigma = 2 \), find \( \text{Prob}(19.25 < X < 20.25) \) on a random draw.
   b) If \( X \) is not distributed normally, but \( n = 49 \) and \( \sigma \) is assumed to be 14, find the probability that \( \bar{X} \) will be within 2 units of \( \mu \).
   c) If \( X \) is not distributed normally and \( n = 4 \) and \( \sigma \) is assumed to be 14, what is the minimum percentage of the sampling distribution for \( \bar{X} \) that will be within 14 units of \( \mu \).
   d) Why can’t the central limit theorem be used in part c (to establish a normal distribution for \( \bar{X} \) )?

18 pts.
4) a) Construct a 90 percent confidence interval for \( \mu \) using the following information: \( n = 64 \), \( \bar{X} = 20 \) and \( s = 4 \).
   b) Construct a 95 percent confidence interval for \( \mu \) using the following information: \( n = 16 \), \( \bar{X} = 20 \) and \( s = 4 \).

I have neither given nor received unfair aid on this test nor am I aware of anyone else who has.