Solutions to the Additional Practice Problems for Exam 1

1. Note: for this problem, I am only listing the types of things you should think about; there are many ways you can combine these ideas into a final written answer.
   Considerations for this problem:
   - Study 2 was performed on real roads in real driving situations; Study 1 was performed under "artificial" conditions which might not represent real driving
     - E.g. maybe the drivers in Study 1 were more likely to take risks, since they perceived that there was no real danger/harm on the course
   - The sample in Study 2 was all truck drivers, and it is easy to think of ways these drivers might be different than other drivers.
     - For example: Are they more likely to take risks behind the wheel because they spend so much time driving/feel more confident in their driving abilities? Are they better drivers? More or less likely to text than other drivers?
     - These are all potential lurking variables that should be measured and accounted for in any analysis.
   - Study 1 is an experiment; study 2 is an observational study. In general, experiments provide stronger evidence than observational studies.
     - Randomized experiments are the strongest study design of all. The use of randomization in Study 1 is not clear, so there might be some hesitation here about declaring this the clear-cut "winner." [In real life, it would be worth checking the original study to see if you could find out more about their use of randomization, if any.]
   - Overall, I would say that Study 1 provides stronger evidence that texting while driving is dangerous. This is based on a strength of Study 1 (it is an experiment) and a weakness of Study 2 (all subjects were truck drivers, which may not represent all drivers).

2.
   a. Response is amount of time spent dealing with audits. (Note: since this is a quantitative variable; we should summarize with a mean.)
      Parameter is average time for all accountants at this firm.
   b. On average the sample times spent dealing with audits were 0.7 hours from the mean of 3.99 hours (roughly speaking). OR The average distance between the sample times spent dealing with audits and the mean of 3.99 was 0.7 hours (roughly speaking).

3.
   a. Binomial with $n = 5$ $p = \frac{80}{120} = 0.667$

      $P(X = 2) = \binom{5}{2}(0.667^2)(0.333^3) = 0.164$

   b. $\mu = (5)(0.667) = 3.335$ applicants

      $\sigma^2 = (5)(0.667)(0.333) = 1.111$ applicants-squared

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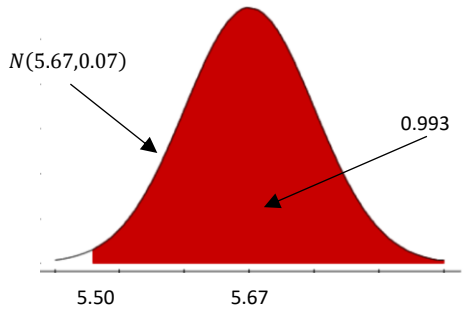
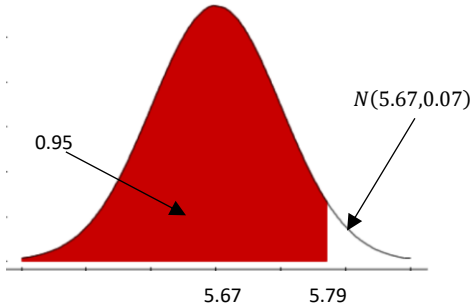
4.

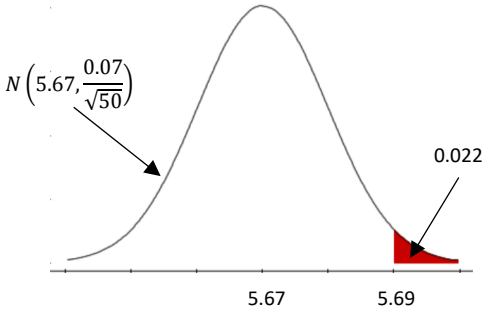
a.



b.



c. Note the different values standard deviation! Since this problem is asking about the average weight, we need to use $\sigma_{\bar{y}} = \frac{0.07}{\sqrt{50}} = 0.01$



5. $E(T) = E(n\bar{X}) = nE(\bar{X}) = n\mu$

$V(T) = V(n\bar{X}) = n^2 V(\bar{X}) = n^2 \frac{\sigma^2}{n} = n\sigma^2$