

Problem Sets Afer Test 2

Only turn in problems that are **not** bracketed. Bracketed problems are additional problems you can look at. Round brackets indicate problems that may help you with problems that are assigned; square brackets are additional problems on material that you should know, but you are not required to write up solutions; curly brackets are truly optional and may contain extra nuggets that you will not be required to know but may be interested in.

Additional assignments will be filled in over time.

Due	Task	Source	Problems
Mon 11/9	PS 16	FASt 4	15 sensitive questions 21 rule of thumb 22 poll 32 not unbiased
Thu 11/11	PS 17	FASt 3 FASt 4	57 circle 58 circle again 24 z test 27a checking coverage rate 30a one-sided CI 33 unbiased
Mon 11/15	PS 18 WW 18	FASt 4	39 vector decomp of \mathbf{x} (40) vector decomp of \mathbf{x} (41) vector decomp of \mathbf{x} (42) vector decomp of \mathbf{x} Additional Question: After doing problems 40–42 (submitting your answers in webwork), comment on any patterns you are noticing across the 3 problems. Note: There are two reasons for doing these problems. One is to make sure you understand the details involved, the other is to make sure you are observing these big picture patterns.
Thu 11/18	PS 19	FASt 4	38 t/F 43 vector decomp of \mathbf{x} 47 one-sided 48 sample size The following R code might be helpful. <pre>library(fastr2) df_stats(Sepal.Length ~ Species, data = iris, mean, sd, n = length) ## response Species mean sd n ## 1 Sepal.Length setosa 5.006 0.3524897 50 ## 2 Sepal.Length versicolor 5.936 0.5161711 50 ## 3 Sepal.Length virginica 6.588 0.6358796 50 Versicolor <- iris > filter(Species == "versicolor")</pre>

Due	Task	Source	Problems
Tu 11/23	PS 20	FASt 4	<p>28 weight gain 44 sepal width [45–46] more iris 49 uniform p-values 51 MIAA 55–56 Burger Barn 58 endurance 59 Joe's coins</p> <p>Some R advice for 51 and 56:</p> <ul style="list-style-type: none"> • Use <code>set.seed()</code> to set the seed for the random number generator so that things don't change every time you knit; • For simulations, it is handy to write a function that performs one simulation and returns (not prints) the information you want about that simulation. Then use <code>do()</code> to do this multiple times. If your function returns a named vector (<code>c()</code> is handy for this) or a 1-row data frame (<code>tibble()</code> is handy for this), the results will be a nice tidy data frame with one row per simulation. • Be sure to include enough output that I can tell what's going on. <ul style="list-style-type: none"> – You might like to show the output from one simulation as an example. (And also to convince yourself that things are doing what you expect them to be doing.) – But do not print out hundreds or thousands of rows of simulated results! – Graphical and/or numerical summaries of simulated results work must better. • Do this in R Markdown – don't hand copy R code!
Tue 11/30	PS 21	FASt 4	<p>61 scent 62 corn 63 Q 65a power</p> <p>Read the article <i>Randomness and God's Governance</i> (available at http://ministrytheorem.calvinseminary.edu/wp-content/uploads/2016/06/9_pruim.pdf or https://biologos.org/blogs/guest/randomness-and-gods-governance-part-1 and answer the following two questions:</p> <ol style="list-style-type: none"> 1 Pick one idea that the article addresses or hints at that you find interesting to think about and write a bit about it. Here are some questions that might help you get started: Why did you pick that topic? What makes it interesting or challenging to think about? Is there something in the article that you disagree with, or that made you think about things differently from how you had thought about them before? 2 Mathematically, insurance, the lottery, and the casino are all pretty similar. In each case those running the business set the prices in such a way that the expected value of their return is positive (for them) and the probability of them losing money is very low. The distributions differ from one setting to another, but the basic outline is the same. For each of these three (insurance, lottery, casinos), answer two questions: (a) Should Christians participate? (b) Should it be legal? (You can put your answers in a 3×2 grid if you like.) Then discuss briefly how you chose your answers. Are there big ideas at play? If so, what are they?

Due	Task	Source	Problems
never	WW 22 PS 22	FASt 4	Some propagation of uncertainty practice for you. [36abc] difference in means [36de] difference in means [66] bootstrap [70–74] propagation of uncertainty