

Math 321 – Summer 2019

additional practice for chapter 6, hypothesis testing

1. If we flip a fair coin 100 times, and get 60 heads. Test the hypothesis that the coin is fair at the 5% significance level.
2. Consider that a group of 25 people is randomly chosen from of a certain demographic category. The mean height is found to be 5 foot 8 inches and the sample standard deviation is found to be 2 inches. Test the hypothesis that the true mean height of this demographic category is 5 ft 9in at the 5% significance level.
3. An internet server has data requests arrive at a very high rate. The number of data requests in a minute is collected for 60 randomly chosen 1 minute intervals. The sample mean requests per minute is found to be 982. Test the hypothesis that true mean number of requests per minute is 1000 at the 5% significance level. Consider that the number of requests in a minute can be modeled by a Poisson RV.
4. Recent polling data of 5,000 individuals indicate an approval rating for Trump of 43%. At the same time during Obama’s first term his approval rating was 45%. Test the hypothesis that Trump’s approval rating is at least as good as Obama’s to the 5% significance level.
5. A construction materials manufacturer claims that a particular material of theirs can withstand 5,000 tons before failing. A sample of size 7 is randomly selected and tested until failure. The mean force until failure is found to be 4,900 lb with a standard deviation of 200 lb. Test the manufacturer’s claim at the 5% level.

6. Here is the racial and ethnic makeup of US active duty military in 2016

Am Ind / Ak Nativ	Asian	Blk / Afr Am	Hisp / Lat	Multiple	Nat Haw / Other	White
2100	15861	63380	60466	14142	4556	320801

Here is what the actual general population demographics were at the time:

Am Ind / Ak Nativ	Asian	Blk / Afr Am	Hisp / Lat	Multiple	Nat Haw / Other	White
0.013	0.057	0.13	0.166	0.028	0.002	0.604

Test the hypothesis that the military is chosen randomly from the population, i.e. that the military demographic proportions are actually those of the general population.

7. The number of casualties in Operation Iraqi Freedom are given below according to gender and military branch.

	Army	Navy	Marine Corps	Air Force
Female	547	6	41	33
Male	21683	547	8573	417

Test for independence of gender and military branch to the 5% level.