# Assignment 3

Due Monday, July 30

1. 6.03. Chapter 6, page 133.
2. 6.07. Chapter 6, page 133.
3. 6.09. Chapter 6, page 133.
4. 6.10. Chapter 6, page 133.
5. 6.13. Chapter 6, page 134.
6. 6.17. Chapter 6, page 135.
7. 6.19. Chapter 6, page 135.
8. 6.22. Chapter 6, page 136.
9. It is believed that the number of students absent in STAT 270 on a given day has a Poisson distribution with parameter $\lambda$. The absences data for 50 days are given in the following table

| # of absences | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| frequency | 1 | 4 | 8 | 10 | 8 | 7 | 5 | 3 | 2 | 1 | 1 |

Obtain a $(1-\alpha)100\%$ CI for $\lambda$. (Hint: the mean and variance of the Poisson distribution are equal. Use a sample estimate $\hat{\lambda}$ to construct the CI.)

10. Consider a random sample of size $n$ from a normal distribution with mean $\mu$ and variance $\sigma^2 = 81$. We are interested in testing $H_0 : \mu = 75$ versus $H_1 : \mu < 75$.

    (a) How many standard deviations below the null value is $\bar{x} = 72.3$?

    (b) If $\bar{x} = 72.3$, what is the test result using $\alpha = 0.01$?

    (c) If we reject $H_0$ when $z \leq -2.88$, what significance level $\alpha$ is used?

    (d) What is $\beta(70)$ for the test in part (c)?

    (e) For the test in part (c) how large must $n$ be to ensure $\beta(70) = 0.01$?

    (f) If a level 0.01 test is used with $n = 100$, what is the type I error probability when $\mu = 76$?

11. 7.01. Chapter 7, page 151.

12. 7.03. Chapter 7, page 152.

13. 7.05. Chapter 7, page 153.

14. 7.06. Chapter 7, page 153.

15. 7.07. Chapter 7, page 153.

16. 7.11. Chapter 7, page 154.

17. 7.12. Chapter 7, page 154.

18. 7.13. Chapter 7, page 155.

19. An experiment was conducted to stuudy the effect of four drugs on blood pressure. The results are given in the following table

| Drugs | $n$ | $\bar{x}$ | $s$ |
|---|---|---|---|
| 1 | 10 | 121 | 10.2 |
| 2 | 10 | 115 | 11.5 |
| 3 | 7 | 118 | 12 |
| 4 | 6 | 125 | 11.8 |

    (a) Construct a 95% confidence interval for the difference between the average blood pressure of patients in groups 1 and 3.

(b) Determine if there is a significance difference between the effect of any two of the drugs. (Use $\alpha = .01$)

20. Consider a bag containing all types of coins: toonies, loonies, quarters, dimes, nickels, and pennies. We are interested in testing the hypothesis of having more pennies than any other coins. If we select 35 coins out of the bag what is the minimum number of pennies required in order to reject the hypothesis of having equal number of each type at $\alpha = .01$?