Homework 1

July 8, 2009

4.58

- $P(Z \geq 0) - P(Z \geq 1.2)$
- $P(Z \geq 0) - P(Z \geq .9)$
- $P(Z \geq .3) - P(Z \geq 1.56)$
- $1 - 2 * P(Z \geq .2)$
- $P(Z \geq .2) - P(Z \geq 1.56)$

4.59

- $z_0 = 0$
- $z_0 \simeq 1.10$
- $z_0 \simeq 1.645$
- $z_0 \simeq 2.575$

7.10

- $\bar{Y} \sim N(\mu, \frac{\sigma^2}{n} = \frac{4}{9}), so\ P(|\bar{Y} - \mu| \leq .3) = P(|Z| \leq .45) = 1 - 2 * P(Z \geq .45) \simeq .3472$
- .5468, .6318, .7062, .7698
- As n increase, so does the probability.
- The probability when $\sigma = 2$ is less than when $\sigma = 1$

7.12 $P(|\bar{Y} - \mu| \leq 1) \geq .9 \Rightarrow P(|Z| \leq \frac{\sqrt{n}}{4}) \geq .9 \Rightarrow \frac{\sqrt{n}}{4} \geq 1.65 \Rightarrow n \geq 43.56 \Rightarrow n = 44$

7.15

1. $E(\bar{X} - \bar{Y}) = E(\bar{X}) - E(\bar{Y}) = \mu_1 - \mu_2$
2. $V(\bar{X} - \bar{Y}) = V(\bar{X}) + V(\bar{Y}) = \frac{\sigma_1^2}{m} + \frac{\sigma_2^2}{n}$
3. $V(U) = \frac{9}{2n}$, so $P(|U - (\mu_1 - \mu_2)| \leq 1) \geq .95 \Rightarrow P(|Z| \leq \frac{\sqrt{2n}}{3}) \geq .95 \Rightarrow P(Z \geq \frac{\sqrt{2n}}{3}) \leq .025 \Rightarrow \frac{\sqrt{2n}}{3} \geq 1.96 \Rightarrow n \geq 17.29$, so $n = 18$.

7.19 $\frac{(n-1)S^2}{\sigma^2} \sim \chi^2_{n-1}$, so $P(S^2 \geq .065) = P(\chi \geq 14.625) \simeq .1$.