AMS 315, Spring 2022

Midterm Examination 1

Solutions and Penalties

March 1, 2022

AMS 315 S2022 Grade Distribution Midterm Examination 1

Upper Quartile Point: 280	Mean: 216.3
Median: 225	Standard Deviation:75.8
Lower Quartile Point: 155	IQR Standard Deviation: 92.5

AMS 315 S2021 Midterm 1 Grading Protocol

Directions to graders: Always grade a question as you would like to be graded. Penalize minor computational errors with a 2-point penalty and more serious errors with a 5-point penalty. Using the wrong procedure is penalized 50 points. Incorrect or no decision is penalized 35 points; partially incorrect or missing decisions are penalized 20 points. Please make sure that you clearly put the number of points that each student earned on each question.

Specific Questions

1A: Bayes' Theorem. Part A asks for $P(X)$. This is either right or wrong, modulo computation errors. Part B asks for $P(A|X)$; -25 for $P(B|X)$.

1B: Paired t confidence interval. In Part A, no paired t test: -50; +15 for recognizing a paired t problem; incorrect degrees of freedom: -20; wrong size of confidence interval (99% rather than requested 95%): -10; incorrect sample variance of differences: -20. In Part B, no paired t-test, -10. Give full credit for a decision consistent with paired t-test calculations.

2C: 2 independent sample confidence interval. In part A, correct s_P^2 is worth +15; -25 for using normal value (-2.576) instead of t-value; confidence interval centered on $\bar{y}_4 - \bar{x}_6$ is penalized -5; -15 for wrong degrees of freedom; -10 for 98% confidence interval; -25 wrong standard error of $\bar{x}_6 - \bar{y}_4$. Unequal variance procedure should not be penalized if approximate degrees of freedom is close to 8. In Part B, -10 for no decision or inconsistent decision.

2D: 2 independent sample t-test. In part A, correct s_P^2 is worth +15; -25 for using normal value (1.645, 1.960, 2.576) instead of t-value; -15 for wrong degrees of freedom; -25 wrong standard error of $\bar{x}_7 - \bar{y}_5$. Unequal variance procedure should not be penalized if approximate degrees of freedom is close to 10; -35 for no decision or inconsistent decision.

3C: Two-sided test of variance. Using a one-sided test -15; -15 for wrong degrees of freedom; 35-point penalty for no decision or inconsistent decision.

3D: Confidence interval for a variance. Penalties: -15 for wrong degrees of freedom; -10 for 98% confidence interval; -15 for missing 11.14; -15 missing .4844. In Part B, -10 for no decision or inconsistent decision.

4E and 4F: Confidence interval for ratio of two variances. Penalties: -15 for each wrong degree of freedom; -10 for wrong size of confidence interval; -15 for missing left endpoint critical value; -15 missing right endpoint critical value. In Part B, -10 for no decision or inconsistent decision.

5G and 5H: Forget to square to get J: -35; wrong $|z_\alpha| - 15$; wrong $|z_\beta| - 15$; wrong $\sqrt{\sigma_0^2 + \sigma_1^2}$ -20. Part B: -5 no answer or inconsistent answer.

6I and 6J: Part A: -5 for complement of correct answer. Part B: -25 wrong $E(S_n)$; -25 wrong $var(S_n)$; -10 for complement of correct answer.