CHE 320 Spring 2017 Exam 2 Review Objectives

Chapter 3

1. Be able to verify normality if given a probability plot (3-6)
2. Given a function of random variables, be able to calculate the Expected Value (mean) and Variance of the function (3-12)
3. Understand the Central Limit Theorem (3-13)

Chapter 4

1. Be able to verify the bias of an estimator, identify the MVUE, and calculate the relative efficiency (4-2)
2. Be able to calculate Type I and II Errors (for Z-tests and T-tests) (4-3)
3. Be able to formulate hypotheses and test with P-values and Confidence Intervals using Z-tests, T-tests, and χ^2-tests (4-4, 4-5, 4-6)
4. If given a table of observed and expected frequencies, be able to perform a goodness-of-fit procedure (4-10)

Chapter 5

1. Be able to formulate hypotheses and test with P-values and Confidence Intervals using two-sample Z-tests, T-tests (pooled-t, t_0^*, and paired-t), and F-tests (5-2, 5-3, 5-4, 5-5)
2. Given a set of data, be able to construct the entire ANOVA table and use it to draw conclusions about the hypothesis (5-8)
3. Understand testing equality of treatment effects and testing which treatments differ (5-8)
4. Understand difference between randomized ANOVA and randomized block ANOVA (5-8)

Chapter 5:

↳ 2-sample tests

↳ ANOVA

Single

Test	Variance	Statistic
μ	known	z-test
μ	unknown	t-test
σ^2		χ^2-test

Two-Sample

Test	Variance	Statistic	Type II
difference in μ	known	z-test	— ✓
difference in μ, independence	unknown but equal	pooled t-test	✓
	unknown but not necessarily equal	t_0^*-test	
difference in μ, dependent		paired t-test	
equality in σ^2		F-test	

ANOVA:

"factor"

↳ While two-sample test compared a feature between two sample sets, what if we wanted to compare >2?

"level" — "treatments"

- Want to answer whether the factor has an effect on the treatments.

observation $Y_{ij} = \mu + \tau_i + \varepsilon_{ij}$ ← random error

μ: overall mean; τ_i: deviation of treatment i

$H_0: \tau_1 = \tau_2 = \cdots = 0$

$H_1: \tau_i \neq 0$ for at least one i

Total sum of squares:

$$SS_T = SS_{Treatments} + SS_{Error}$$

DOF: SS_T: $an-1$; $SS_{Treatments}$: $a-1$; SS_{Error}: $a(n-1)$

Mean Squares:

$$MS_T = MS_{Treatments} + MS_{Error}$$

$$MS_{Treatments} = \frac{SS_{Treatments}}{a-1}$$

$$MS_{Error} = \frac{SS_{Error}}{a(n-1)}$$

$$F_o = \frac{MS_{Treatments}}{MS_E}$$

ANOVA Block design:

↳ Cases where each observation is taken from the same block (analogous to paired-t test)

$$SS_T = SS_{Treatments} + SS_{Error} + SS_{blocks}$$

DOF: $ab-1 = a-1 + (a-1)(b-1) + b-1$

Exam 2:

Ch 3 (3-6, 3-12, 3-13)

Ch 4 (omit 4-7, 4-8)

Ch 5 (omit 5-6)

Thur 8-9pm Wthr 200