

# PSYC 4301: Psychological Tests and Measurements

Tarleton State University

Homework 3

1. Composite SAT scores consist of two subtests: Reading and Writing, which has mean  $\mu_1 = 531$  and standard deviation  $\sigma_1 = 104$ , and Math, which has mean  $\mu_2 = 528$  and standard deviation  $\sigma_2 = 117$ . In addition, the correlation between the two subtests is  $r = 0.81$ .
  - (a) Compute the mean composite SAT score.
  - (b) Compute the standard deviation for the composite SAT. Be sure to show the variance-covariance matrix for the two subtests.
  - (c) Suppose you score a 1250 on the composite SAT. What is your percentile rank?
2. Five students were given the following scores on three essay questions:

	Q1	Q2	Q3
Ann	9	8	7
Bill	5	3	4
Carol	8	8	7
David	7	6	8
Erin	6	5	7

- (a) Calculate the mean and standard deviation for each item.
  - (b) Compute the pairwise correlations between each item.
  - (c) Compute the variance-covariance matrix for the three questions.
  - (d) Compute the mean and standard deviation of the composite score that is found by summing the scores from the three essay questions.
3. For a battery of three subtests, the following variances were obtained:
  - for Test 1,  $\sigma_1^2 = 9$
  - for Test 2,  $\sigma_2^2 = 25$
  - for Test 3,  $\sigma_3^2 = 16$ .

Furthermore, the correlation between tests 1 and 2 is 0.81; between tests 1 and 3, 0.64; and between tests 2 and 3, 0.90.

- (a) Compute the variance-covariance matrix for the three subtests.
  - (b) Determine the variance of the composite test.