Homework 4 Chapter 10

Due on March 7

Math 125 *Kovitz* Spring 2025

The important problems are 1 (a), 4, and 6.

1. In a certain class, midterm scores average out to 70 with an SD of 10, and final exam scores average out to 60 with an SD of 15. The correlation between midterm scores and final exam scores is about 0.60.

   (a) Estimate the average final exam score for the students whose midterm scores were

   (i) 80 (ii) 40 (iii) 60 (iv) 70

   (b) Plot your regression estimates and use them to draw the regression line.

2. In a study of the stability of IQ scores, a large group of individuals is tested once at age 18 and again at age 35. The following results are obtained.

   age 18: average score ≈ 100, SD ≈ 15
   age 35: average score ≈ 100, SD ≈ 15, $r \approx 0.75$

   (a) Estimate the average score at age 35 for all the individuals who scored 124 at age 18.

   (b) Predict the score at age 35 for an individual who scored 124 at age 18.

3. In one study, the correlation between the educational level of husbands and wives in a certain town was about 0.50; both averaged 12 years of schooling completed, with an SD of 3 years.

   (a) Predict the educational level of a woman whose husband has completed 16 years of schooling.

   (b) Predict the educational level of a man whose wife has completed 14 years of schooling.

   (c) Apparently, well-educated men marry women who are less well educated than themselves. But the women marry men with even less education. How is this possible?

4. In a study of a representative group of men, the correlation between height and weight was 0.43. One man in the study was both three SDs above average in height and three SDs above average in weight. His weight will be

   (i) larger than (ii) smaller than (iii) equal to

   the estimated average weight of all men of his height in the study. Explain your choice.

5. For the first-year students at a certain university, the correlation between SAT scores and first-year GPA is about 0.60. The scatter diagram is football-shaped. Predict the percentile rank on the first-year GPA for a student whose percentile rank on the SAT was

   (a) 92% (b) 31% (c) 50% (d) unknown

6. True or false: A student who is at the 40th percentile of first-year GPAs is also likely to be at the 40th percentile of second-year GPAs. Explain briefly. (The scatter diagram is football-shaped.)