MATH-1110 (DUPRÉ) FALL 2017 TEST 1

1. PRINT YOUR LAST NAME IN THE UPPER RIGHT CORNER IN LARGE CAPITAL LETTERS.

2. PRINT YOUR FIRST NAME UNDERNEATH YOUR LAST NAME IN THE UPPER RIGHT CORNER IN CAPITAL LETTERS.

3. PRINT YOUR LAB DAY AND START TIME AND LECTURE TIME UNDERNEATH YOUR FIRST NAME IN THE UPPER RIGHT CORNER.

For the next two problems, X and Y are unknowns with expected values

$$\mu_X = 8,\ \mu_Y = 10,$$

with standard deviations $\sigma_X = 2,\ \sigma_Y = 4$, **and with correlation coefficient** $\rho = .7$.

4. What is $Cov(X, Y)$, the covariance of X with Y?

ANSWER: $Cov(X, Y) = \rho\sigma_X\sigma_Y = (.7)(2)(4) = 5.6$.

5. What is $E(XY)$, the EXPECTED VALUE of the product XY?

ANSWER: $E(XY) = \mu_X\mu_Y + Cov(X, Y) = (8)(10) + (.7)(2)(4) = 85.6$.

The remaining problems all use the information that follows. Suppose that Sam has an aquarium tank and he knows that the fish in his tank have an average weight of 25 milligrams with a standard deviation of 4 milligrams. Joe takes two fish from Sam's aquarium, one after another, but Sam does not see which fish Joe takes. Joe does not know anything about the weights of the fish in Sam's aquarium.

6. What should Sam EXPECT is the weight of the first fish Joe took from the aquarium?

ANSWER: 25 milligrams

7. What should Sam EXPECT is the squared error in his expected weight of the first fish?

ANSWER: EXPECT the squared error to be $\sigma^2 = 4^2 = 16$.

8. What should Sam EXPECT is the total weight of both fish Joe took from the aquarium?

ANSWER: 50 milligrams.

9. If Joe guesses the weight of the first fish is 22 milligrams, then what is the squared error that Sam EXPECTS Joe is making?

ANSWER: EXPECT the squared error to be $4^2 + (25 - 22)^2 = 16 + 9 = 25$.

10. What should Sam EXPECT is the average weight of the fish left in the tank?

ANSWER: 25 milligrams.