Yarmouk University	Stat 211	16-Nov-08
Dept of Statistics	First Exam – Make up	One Hour

Name: Univ. #:

Q1. Contracts for two construction jobs are randomly assigned to one or more of three firms. A, B, and C. Let Y_1 denoted number of contracts assigned to firm A, and Y_2 denoted number of contracts assigned to firm B.

1) *(4 pts)* **Find the joint probability function for Y_1 and Y_2.**

Y_1 \ Y_2	0	1	2
0	1/9	2/9	1/9
1	2/9	2/9	0
2	1/9	0	0

2) *(2 pts)* **Find F(0,1)** $= P[Y_1 \le 0, Y_2 \le 1] = P(0,0) + P(0,1)$

$= 1/9 + 2/9 = 3/9$

3) *(2 pts)* **Are Y_1 and Y_2 independent random variables? Why?**

$P(0,0) \overset{??}{=} P(0)\,P(0)$ NOT indep RVs.

$1/9 \neq \frac{4}{9}\,\frac{4}{9}$

Q2. *(5 pts)* **Let Y_1, Y_2, Y_3, X_1, X_2 be a random variables, with $\mathrm{Cov}(X_i,Y_j) = \frac{i-j}{i+j}$, i = 1, 2; j = 1, 2, 3.**

Define $U = Y_1+Y_2 - 3Y_3$, $W=-3X_1-X_2+5$. Find the value of Cov(W, U) where

$= Cov(-3X_1, Y_1) + Cov(-3X_1, Y_2) + Cov(-3X_1, -3Y_3)$

$+ Cov(-X_2, Y_1) + Cov(-X_2, Y_2) + Cov(-X_2, -3Y_3)$

$= -3[0] - 3\left[-\frac{1}{3}\right] + 9\left[-\frac{2}{4}\right] - \frac{1}{3} - 0 + 3\left[-\frac{1}{5}\right]$

$= -4.433$