Probability 201-1-2391 ASSIGNMENT 9
The correlation coefficient
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Problem 1

Three balls are distributed into three cells. Compute $R(X,Y)$ where X is the number of balls in cell 1 and Y is the number of balls in cell 2. $R(X,Y) = -1/2$

Problem 2

We throw a red dice and a green dice. Let X be the result in the red dice, and Y the maximum result. compute $R(X,Y)$.
$R(X,Y) = 0.6$.

Problem 3

Prove that if $Y = n - X$, then $R(X,Y) = -1$.

Problem 4

Let X be the number of sons in a family that has N children. Let Y be the number of daughters in that family. We define $T = X - Y$. Compute $Var(T)$. $Var(T) = N$.

Problem 5

A jar contains 5 balls that are numbered $1, 2, 3, 4, 5$. Three balls are randomly pulled out (they are NOT returned back). Let X be the minimal number pulled out, and Y be the maximal number pulled out.
a) Construct the table of the joint distribution of (X,Y) and compute the marginal distributions of X and of Y.

.	3	4	5	.
1	0.1	0.2	0.3	0.6
2	0	0.1	0.2	0.3
3	0	0	0.1	0.1
.	0.1	0.3	0.6	.

b) Compute $R(X,Y)$. $R(X,Y) = 1/3$.