EXAM FOR PROBABILITY & STATISTICS (6PAS1)
WINTER SEMESTER 2024/2025

QUESTIONS SET NO. 3

1. Formulate and prove the inclusion-exclusion princile. Does the same principle hold for infinite sets?

2. Compute the correlation between the random variables X and Y, if their joint probability function is given by the following table. Also compute the correlation between X^2 and Y^2.

<table>
<tr><td></td><td colspan="2" align="center">X</td></tr>
<tr><td></td><td>0</td><td>1</td></tr>
<tr><td>-1</td><td>7/30</td><td>1/10</td></tr>
<tr><td>0</td><td>4/30</td><td>2/10</td></tr>
<tr><td>1</td><td>1/30</td><td>3/10</td></tr>
</table>

(Y labels the rows: -1, 0, 1)