# ECE 131A HW 1

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October 2, 2022

## Problem 1

### (a)

The sample space is just all the combinations of the two dice, with $r$ denoting the bottom face of the red die and $g$ denoting the bottom face of the green die. Therefore the sample space is just all the 16 orderd sets possible combinations of the possible results of $r$ and $g$. In other words, the sample space is

$$\boxed{\begin{aligned}&\{(1,1),(1,2),(1,3),(1,4),(2,1),(2,2),(2,3),(2,4),\\&(3,1),(3,2),(3,3),(3,4),(4,1),(4,2),(4,3),(4,4)\}\end{aligned}}$$

### (b)

#### (i)

$$E = \boxed{\{(1,1),(1,3),(3,1),(3,3)\}}$$
$$F = \boxed{\{(1,4),(2,3),(3,2),(4,1)\}}$$

**(ii)**

Since $E$ requires all values to be odd, and thus their sum to be even and $F$ requires the sum of the values to be odd (5), these sets are disjoint, thus:

$$E \cap F = \boxed{\emptyset}$$

**(iii)**

$$E \cup F = \boxed{\{(1,1),(1,3),(3,1),(3,3),(1,4),(2,3),(3,2),(4,1)\}}$$

**(iv)**

$G^c$ is effectively just all value sof $g$ and $g$ such that $g + r \geq 7$, thus

$$G^c = \boxed{\{(3,4),(4,3),(4,4)\}}$$