BSM Course on Markov Chains and Dynamical Systems, Spring 2024
Quiz #1, February 15; **NAME:**

1. Two fair dice are rolled. Consider the following events:

$A = \{$At least one of the two dice turns up 2.$\}$ $B = \{$The sum of the two values rolled is 5.$\}$

Compute (i) $\mathbb{P}(A) =$

(ii) $\mathbb{P}(A|B) =$

(iii) Are A and B independent?

2. Consider a biased coin that turns up Head with probability p, and turns up Tail with probability $q = 1-p$. We keep flipping this coin until it turns up Head for the first time. Let X denote the number of flips. Express, in terms of q, the probability
$\mathbb{P}(X$ takes an even value$) =$

Bonus Consider the previous problem and assume this time $\mathbb{P}(X$ takes an even value$) = \frac{1}{4}$. Determine $\mathbb{E}X$.

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