

NAME AND NETID:

Question 1. The probability of a Texas A&M student of going to a football game depends on how long they have been at the University and what is their favorite color. Let F represent a freshman, S a sophomore, and J a junior, while M if their favorite color is maroon. The probabilities are:

$$\mathbb{P}(F) = 0.23, \quad \mathbb{P}(S) = 0.30, \quad \mathbb{P}(J) = 0.17, \quad \mathbb{P}(M) = 0.20, \quad \mathbb{P}(S \cap M) = 0.08.$$

1. Calculate the probability that a student going to a game is a sophomore or has maroon as their favorite color. [2]
2. Calculate the probability that a student going to a game does not have maroon as their favorite color. [2]
3. Using the fact that being in a different year describes mutually exclusive events, bound the probability that a student going to a game is a senior. [2]

Question 2. Three cards are drawn from a deck of thirty playing cards separated into three equally portioned suits: red, green, and blue. Let \mathcal{S} be the sample space of the suits of all drawn hands of three cards.

1. Assuming cards are drawn without replacement, calculate the probability that a blue is drawn first and a green last. [2]
2. Assuming cards are drawn with replacement, calculate the probability of at least two reds being drawn. [2]

Bonus Question. The New England Patriots have a stock of 100 game balls. An inspection into this stock has yielded that at least 45 of the balls are deflated per NFL standards. If Tom Brady randomly selects from the stock eight balls for the game, determine the probability:

1. That three of them are deflated. *[2]*
2. That at least one of them is deflated. *[2]*