1154-M5-1770   **Michael Czekanski*** (`mczekanski@middlebury.edu`) and **Alex Lyford**
(`alyford@middlebury.edu`). *Making Money on Scratch Tickets—The Impact of Prize Structures.*

Scratch tickets are ubiquitous, and the consensus stands that these games are not worth playing to make money. From the outset, the expected value of a ticket is less than the cost to play the game. Thus, in the long run, we will lose money if we play this game repeatedly. However, for lotteries that publish prize structures and the number of unsold tickets and grand prizes remaining, we can accurately estimate the expected value of a ticket. For these games, we show that we can accurately bound the expected value of the game through simulation—the lower bound of which frequently exceeds the cost of a ticket. The point and frequency at which this occurs is highly dependent upon the prize structure of the game. In this work, we examine Vermont's scratch tickets, since the Vermont Lottery both publishes this data and has prize structures that vary substantially. For example, some games have just a few grand prizes worth upwards of $20,000, and others have more prizes, each worth much less, such as the game "Win Either $25 or $50". Finally, we analyze the impact of different prize structures to see how they affect the behavior of the expected value of a ticket over the course of the game. (Received September 16, 2019)