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On a Multiple-Choice Guessing Game

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ON A MULTIPLE-CHOICE GUESSING GAME

RYAN CUSHMAN* AND ADAM HAMMETT

Abstract. Meet Ann and Gus. They are playing a number-guessing game, in which Ann has chosen a random integer between 1 and n for some integer $n \geq 1$. To make things interesting, Ann will permit Gus to ask some number, m, of k-option multiple choice questions about her number, to which she promises to respond truthfully. After Gus finishes with his questions, he must attempt to guess Ann's number. He wins if he guesses correctly, and loses otherwise. We address two primary questions:

(1) What is the maximum probability that Gus will win this game?
(2) What strategies might Gus employ to guarantee that this maximum probability is achieved?

In the course of this talk, we will provide complete answers to each of these questions, and discuss some possible extensions as well. Some surprises are guaranteed!

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