| Name(s) | Project Number |
|---|---|
| Parker A. Snipes | **J1420** |

**Project Title**

## Probability and Risk

**Abstract**

**Objectives/Goals**
My objective was to find out whether, in the board game Risk, the attacker or the defender has a better chance of winning in combat. My hypothesis was that, because of the rule that ties go to the defender, in general the defender would have a less than 50% chance of losing a man in each combat, and thus a slight advantage in the game.

**Methods/Materials**
I needed to find the probability that the defender would lose a man for each possible roll of the die and number of dice rolled (1, 2, or 3). So I used Excel on my laptop to create tables showing various combinations that the attacker and defender could roll and showing in each case the number of men lost by the defender. I then calculated the odds that the defender will lose a man in each scenario.

**Results**
The defender's odds of losing a man vary depending on how many dice the attacker and defender roll. When the attacker rolls only 1 die, the defender#s odds of losing a man are always less than 50%. When the attacker rolls 2 dice, the defender#s odds of losing a man are greater than 50% in 2/3 of the cases. When the attacker rolls 3 dice, the defender#s odds of losing a man are greater than 50% in at least 2 out of 3 cases.

**Conclusions/Discussion**
My hypothesis was correct as to some scenarios, but not as to others. In nearly every case, the defender has a less than 50% chance of losing a man unless the attacker is rolling a greater number of dice than the defender. Thus, a likely winning strategy in Risk would be to attack a territory only if the attacker can roll more dice than the defender in the attack.

**Summary Statement**

My project is about whether the odds favor the attacker or defender in the board game Risk.

**Help Received**

My mom helped me format and glue the board, and my dad helped me describe my results and conclusions.