

MSUM Math Club
Problem of the Fortnight¹
August 26, 2009

Background necessary to complete this problem: Probability, Calculus II.

Professor Peil, Professor James, and Professor Goyt are arguing again about how Calculus I should be taught. They decide to settle their dispute by having a duel. Each professor will stand at the corner of an equilateral triangle. The order in which they fire at each other will be determined uniformly randomly before the duel begins. They will then fire at each other in that order until one person remains standing. It is known that Professor Peil hits his target 100% of the time, Professor James hits his target 80% of the time and Professor Goyt hits his target 50% of the time. Assume that noone is hit by a stray bullet and that each person uses their optimal strategy. Who is most likely to survive? Compute the survival probability of each person given optimal strategy. (Note: Guesses for the first question will not be given many points.)

¹Solutions to the Problem of the Fortnight© must be submitted no later than 13 days after the problem is introduced unless otherwise specified by the Math Club Advisor. Only one solution per person. Solutions will be graded out of 10 points. The person with the solution with the most points will earn the title Math Master for the fortnight. In the event of a tie, the winners will share the title of Math Master for the fortnight and share the Möbius Band. Void where prohibited. You must be a student at MSUM to be eligible. Only humans may submit solutions. Solutions submitted by extra terrestrial entities will be automatically disqualified. Solutions submitted by unicorns will also automatically be disqualified.