

MA 103Q Game Theory Problems 1

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1. In the following game of batter-versus-pitcher in baseball, the batter's batting averages are shown in the table.

		Pitcher throws	
		Fastball	Curve
Batter guesses	Fastball	.400	.200
	Curve	.100	.500

- (a) Find the best mix of pitches for the pitcher.
- (b) If the pitcher uses the mix of pitches that you found in part (a), what is the batter's expected batting average?
- (c) Find the best mix of guesses for the batter.
2. When it is third down and short yardage to go for a first down in American football, the quarterback can decide to run the ball or pass it. Similarly, the other team can use its run defense or its pass defense. This can be modeled as a 2×2 matrix game, where the payoffs are the probabilities of making a first down. We'll use the following table of probabilities:

		Defense	
		Run	Pass
Offense	Run	.5	.8
	Pass	.7	.2

- (a) With what probabilities should the defensive team employ each of its defenses?
- (b) If the defense uses the probabilities you found in part (a), what is the probability that the offense will make a first down?
- (c) With what probabilities should the offensive team employ each of its offenses?