

UW Math Circle

1. Grumpy and Happy recently got into an argument about the proper disposition to have on life. Grumpy is convinced that everyone should be annoyed and complain. Happy is convinced that everyone should be excited and positive. To settle their argument, Doc came up with the following solution: Grumpy and Happy are to stand twenty feet apart and run straight at one another. If one of them dodges to the side, the dodger must do the other's work in the mine for the next week and the one that did not dodge wins the argument. If neither dodges and they collide, both must switch dispositions for the next week and both lose the argument. If both dodge but they still collide, both punishments will be given. Draw a payoff matrix for the game, assigning values to each punishment and reward.



2. Based off of your payoff matrix, what strategy should each of them use?
3. Grumpy and Happy don't think it's fair to decide such an important argument with one round of such a silly game. They want the winner to be decided as the winner of the most rounds out of five. Should they change their strategies? If they do, what should they change them to?

4. Gaston and the Beast are bidding on a new book for Belle. The bookseller decides to auction the book off in a new way. Whoever has the highest bid will win the book however both players must pay the lower bid. If the value of the book is not known, what strategy should Gaston and the Beast use to try to win?

5. If the value of the book is known, should the strategy change? If so, what should the strategy be?