Math 105: Finite Mathematics

Study Problems 2

March 31, 2008

1 Odds

Rewrite the following probabilities as odds.

- A horse called Fat Chance has a $\frac{1}{7}$ chance of winning a race.

- A horse called Old Grey Mare has a $\frac{3}{15}$ chance of winning a race.

2 Expected Value

Five people have shoe sizes of 6, 6.5, 8, 8, and 10. What is the average shoe size?

What is the expected value of a bet where you have a $\frac{2}{3}$ probability of winning \$5 and a $\frac{1}{3}$ probability losing \$8?

3 Standard Deviation

Two teams of five people are needed to play a game of basketball. The members of one team have ages 17, 19, 19, 20 and 21, while the members of the other team have ages 18, 18, 19, 19, 20. What is the standard deviation of the ages of each team?

What is the standard deviation of a bet where you have a $\frac{2}{3}$ probability of winning \$5 and a $\frac{1}{3}$ probability losing \$8?

4 Binary Numbers

Convert the following into binary numbers:

- 4

- 8

- 15

5   Nim

It is your turn in a game of Nim. There are three piles with sizes 16, 23 and 42. Is it possible for you to win? If so, what move should you make?

6   Combinatorial Games (Ch. 18, 19, 27)

A game has five coins on a table in five piles, two pennies and three dimes. A move consists of either combining two piles with the same number of coins or with the same type of coin on top, by placing one pile on top of the other. Who should win this game under optimal play, the first or second player? Draw the game tree to prove your answer, combining all symmetric moves, and propagate the winning information up from the leaves to the initial state.