

Homework 4 - Math 381 A - Winter 2016 - Dr. Matthew Conroy

1. Consider the following game played with a single die.

A player starts with a score of zero and throws the die repeatedly, adding the face that appears on each throw of the die to their score.

If the score is ever a prime number (2, 3, 5, 7, ...), the player loses.

If the score reaches a value of 18 or greater, the player wins.

Model this game using a Markov chain. Set up a transition matrix with two absorbing states (one for winning, one for losing). Use the transition matrix to determine the probability of the player winning the game. Be sure to thoroughly support all of your claims.

2. Consider the Markov chain with states 0, 1, 2, and 3 diagrammed at right. The diagram shows all possible one-step transitions, labelled with the probability.

Transitions with zero probability are omitted from the diagram.

Determine the limiting distribution of this chain.

What percentage of the time is the chain in each state?

