

Homework XI

More Games

Due Dec. 2nd

As usual, think about all problems, this time solve at least one of the problems. Still, your answers should be justified and clear.

Again, these are two-player games, with players taking turns to make moves until someone wins. Again the aim is to find a winning strategy for one of the players.

1. The game starts with the number 1 written on the blackboard. The players take turns adding any integer from 1 through 9 to the current number. The player who reaches the number 100 wins.
2. **Extra Credit.** Consider the last game but this time the player who reaches 100 loses. Now who wins and how?
3. There are 70 pennies on a table. A move consists of removing no more than half of the pennies from the table. The players take turns in doing this move and finally the player who cannot move loses. Who can win and how?
4. Two players start with a 8×9 rectangle of boxes. In each turn, a player is allowed to choose one row or column where not all of the boxes have been crossed out, and cross out that row or column. The player who cannot make a move loses. Who will win and how?