Set 9 - Homework

Name:

(1) You are standing in front of a table wearing a blindfold and gloves. You can feel that there are 100 coins on the table in front of you, but cannot tell which are heads-up and which are tails-up. A TA (wandering in from the previous problem) tells you that 20 of them are heads and the other 80 are tails. You are allowed to move the coins around and flip them over at will and need to divide them into two piles so that each pile has the same number of heads. Can you do it? [Hint: the piles don't have to be the same size.]

(2) The next day, you meet two new people. A tells you: "Both of us are knaves." Is B a knight or a knave?

(3) There is a single pile of rocks, but each player can only remove either a single rock or two rocks. Who wins if there are 3 rocks initially? What if there are 4 rocks? 5 rocks? Make a conjecture and try to prove it!