

MATH 6: HANDOUT 15
ODD AND EVEN

HOMEWORK

1. In a certain country the parliament has 400 members. After voting for a certain bill, the chairman announced that the bill was approved: there were 27 more votes in favor of the bill than against. The opposition claims that the voting results were falsified. Why? [All 400 parliament members voted, and there were no abstainers.]
2. A bag of 300 hundred gold coins has only coins with values of 1, 3, 5 and 15 piasters. The note on the bag says that the total is 1001 piaster. Can it be correct?
3. The numbers 1 through 10 are written on the blackboard in a row, with spaces left between them. Adam and Bill are playing the following game: on his turn, each player puts either + or - between two numbers. After all signs are written (so they get something like $1 + 23 + 4 + 56 \dots$), the total is computed. If it is even, Adam wins; if it odd, Bill. What is the best strategy for Adam? should he take the first turn or leave the first turn to Bill?
4. A grasshopper is jumping along the number line: the first jump is 1 cm long, the second one, 2 cm, and so on. Can he return to his starting position after 9 jumps? 10 jumps? 2021 jumps?
5. The numbers 1 through 6 are written on the board. You can add 1 to two of the numbers. By repeating this many times, can you make all numbers equal? [**Hint:** what is the sum of the numbers? how does it change?]
6. Can you connect 2021 computers with cables so that each computer is connected to exactly 3 other ones? [**Hint:** how many cables you would need?]
7. A train consists of a locomotive and five cars marked I, II, III, IV and V. In how many ways can you rearrange the cars, in such a way that car I is always closer to the locomotive than car II?