

## Math 219: Homework 1

### Due: Friday, January 25th

1) Take a strip of paper and fold it in half several times in the same fashion as in *Paper Strip*. Unfold it and observe that some of the creases are **in** and some are **out**. For example, three folds produce the sequence:

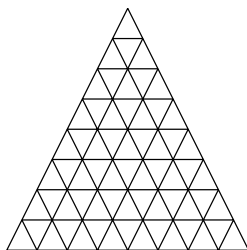
in in out in in out out

What sequence would arise from 10 folds? Explain your reasoning.

2) Fred and Frank are two fitness fanatics on a run from  $A$  to  $B$ . Fred runs half the way and walks the other half. Frank runs for half the time and walks for the other half. They both run and walk at the same speeds. Who finishes first? Explain your reasoning.

3) You have two carafes, one that contains water and another that contains wine. A certain amount of water is transferred to the wine, then the same amount of the mixture is transferred back to the water. Is there now more water in the wine or is there more wine in the water? Explain your reasoning.

4) How many triangles are there on an eight-fold triangular grid?



Carefully explain your reasoning.