True/False - No explanation needed. (For each: 1 point if correct, 0 points if not answered, -1 points if incorrect)

1. In the Odd-Pie Fight problem, it must be the case that two people throw pies at each other. True/False

2. An infinite geometric series $a + ar + ar^2 + ar^3 + \ldots$ converges to $\frac{a}{1-r}$ if and only if $r \neq 1$. True/False

Problems - Need justification.

1. Use mathematical induction to prove that if n is a positive integer,

$$\sum_{\{a_1,\ldots,a_k\} \subseteq \{1,2,\ldots n\}} \frac{1}{a_1 \cdot a_2 \cdots a_k} = n$$

(Here the sum is over all nonempty sets of the set of the n smallest positive integers). (10 points)