

Time limit: 15 minutes.

Instructions: This tiebreaker contains 3 short answer questions. All answers are positive integers. You will submit answers to the problem as you solve them, and may solve problems in any order. You will not be informed whether your answer is correct until the end of the tiebreaker. You may submit multiple times for any of the problems, but **only the last submission for a given problem will be graded**. The participant who correctly answers the most problems wins the tiebreaker, with ties broken by the time of the last correct submission.

No calculators.

1. Find the sum of the squares of all values of x that satisfy

$$\log_2(x + 3) + \log_2(2 - x) = 2.$$

2. The polynomial $f(x) = x^3 + rx^2 + sx + t$ has r , s , and t as its roots (with multiplicity), where $f(1)$ is rational and $t \neq 0$. Compute $|f(0)|$.
 3. Let x and y be integers from -10 to 10 , inclusive, with $xy \neq 1$. Compute the number of ordered pairs (x, y) such that $\left| \frac{x + y}{1 - xy} \right| \leq 1$.
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