Time limit: 15 minutes.
Instructions: This tiebreaker contains 3 short answer questions. All answers must be expressed in simplest form unless specified otherwise. 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. If x, y, and z are real numbers such that $x^2 + 2y^2 + 3z^2 = 96$, what is the maximum possible value of $x + 2y + 3z$?

2. What is the area of the region in the complex plane consisting of all points z satisfying both $\left|\frac{1}{z} - 1\right| < 1$ and $|z - 1| < 1$? ($|z|$ denotes the magnitude of a complex number, i.e. $|a + bi| = \sqrt{a^2 + b^2}$.)

3. Determine
$$\left\lfloor \prod_{n=2}^{2022} \frac{2n+2}{2n+1} \right\rfloor,$$
given that the answer is relatively prime to 2022.