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A1   Find the minimum positive value of $1 * 2 * 3 * 4 * ... * 2020 * 2021 * 2022$ where you can replace $*$ as $+$ or $-$

N2   If $x, y, z \in \mathbb{N}$ and $2x^2 + 3y^3 = 4z^4$, Prove that $6 | x, y, z$

A3   Let $x, y, z \in \mathbb{R}^+$ and $x^2 + y^2 + z^2 = x + y + z$. Prove that

$$x + y + z + 3 \geq 6 \sqrt[3]{\frac{xy + yz + zx}{3}}$$

C4   There is a $8 * 8$ board and the numbers $1, 2, 3, 4, ..., 63, 64$. In all the unit squares of the board, these numbers are places such that only 1 numbers goes to only one unit square. Prove that there is atleast 4 $2 * 2$ squares such that the sum of the numbers in $2 * 2$ is greater than 100.

G5   Let ABC be an acute triangle and G be the intersection of the meadians of triangle ABC. Let D be the foot of the altitude drawn from A to BC. Draw a parallel line such that it is parallel to BC and one of the points of it is A. Donate the point S as the intersection of the parallel line and circumcircle ABC. Prove that S, G, D are co-linear