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by randomusername

- 1 Let n be a positive integer, and $a, b \geq 1, c > 0$ arbitrary real numbers. Prove that

$$\frac{(ab + c)^n - c}{(b + c)^n - c} \leq a^n.$$

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- 2 A convex polyhedron has two triangle and three quadrilateral faces. Connect every vertex of one of the triangle faces with the intersection point of the diagonals in the quadrilateral face opposite to it. Show that the resulting three lines are concurrent.
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- 3 Consider 998 red points on the plane with no three collinear. We select k blue points in such a way that inside each triangle whose vertices are red points, there is a blue point as well. Find the smallest k for which the described selection of blue points is possible for any configuration of 998 red points.
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