Nutcracker: Problem set -1

Maths

- Let a, b, c, d be four real numbers which satisfy $a + b + c + d = 0$ and

$$a^3 + b^3 + c^3 + d^3 > 0$$

  Prove that

$$a^5 + b^5 + c^5 + d^5 > 0$$

- Let a, b, c, d be positive real numbers satisfying

$$a^2 + b^2 + c^2 + d^2 = 4$$

  Prove that

$$\frac{a^2}{b} + \frac{b^2}{c} + \frac{c^2}{d} + \frac{d^2}{a} \geq 4$$

Answers should be sent to one of the coordinators

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before 8:00 PM tomorrow(31^{st} august)