

Kurschak Competition 1977

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- 1 Show that there are no integers n such that $n^4 + 4^n$ is a prime greater than 5.

- 2 ABC is a triangle with orthocenter H . The median from A meets the circumcircle again at A_1 , and A_2 is the reflection of A_1 in the midpoint of BC . The points B_2 and C_2 are defined similarly. Show that H, A_2, B_2 and C_2 lie on a circle.
<https://cdn.artofproblemsolving.com/attachments/f/1/192d14a0a7a9aa9ac7b38763e6ea6a4a95be5.png>

- 3 Three schools each have n students. Each student knows a total of $n + 1$ students at the other two schools. Show that there must be three students, one from each school, who know each other.
