

Flanders Junior Olympiad 2002

www.artofproblemsolving.com/community/c4668

by Peter

- 1 Prove that for all $a, b, c \in \mathbb{R}_0^+$ we have

$$\frac{a}{bc} + \frac{b}{ac} + \frac{c}{ab} \geq \frac{2}{a} + \frac{2}{b} - \frac{2}{c}$$

and determine when equality occurs.

-
- 2 Prove that there are no perfect squares in the array below:

11	111	1111	...
22	222	2222	...
33	333	3333	...
44	444	4444	...
55	555	5555	...
66	666	6666	...
77	777	7777	...
88	888	8888	...
99	999	9999	...

-
- 3 Is it possible to number the 8 vertices of a cube from 1 to 8 in such a way that the value of the sum on every edge is different?

-
- 4 Two congruent right-angled isosceles triangles (with baselength 1) slide on a line as on the picture. What is the maximal area of overlap?

http://www.mathlinks.ro/Forum/album_pic.php?pic_id=287