Problem 6 (due on Monday, November 18).

For real numbers a,b,c consider the system of equations \[x^2+2yz=a,\ \ y^2+2xz=b,\ \ z^2+2xy=c.\] Prove that this system has at most one solution in real numbers x,y,z such that $x\geq y\geq z$ and $x+y+z\geq 0$. Prove that such a solution exists if and only if $a+b+c\geq 0$ and $b=\min(a,b,c)$. Here $\min(a,b,c)$ denotes the smallest number among a,b,c.

No solution were submitted. For a detailed solution see the following link Solution.