

Fun Math Problems

A mailman meets Mr. Jones on the street. The mailman says, "Mr. Jones, how many sons do you have now?" Mr. Jones says, "Three." The mailman asks, "And what are their ages?" Mr. Jones replies, "Well, the product of their ages is your age." The mailman says, "That doesn't help me." Mr. Jones says, "Well, the sum of their ages is the number of windows in that building over there." The mailman says, "That still doesn't help me." Mr. Jones says, "Well, my youngest son has red hair." The mailman says, "Oh, now I know their ages." How old are Mr. Jones' sons?

Two magicians, magician A and magician B, perform a card trick for an audience. Magician A leaves the room, and magician B gives a complete deck of cards to someone in the audience. That person chooses five cards and gives them back to Magician B. Magician B selects one card from those five, gives that card back to the person, and places the other four cards face up on a table. Magician A comes back into the room, looks at the cards and determines exactly what the fifth card is. How is the trick performed?

Prove that if $u \in C^2[0, 1]$, $uu'' \geq 0$, $u(0) = u'(1) = 0$, then $u \equiv 0$. Hint: Integration