EE Quals, 2009

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1. (20 Points)

A survey of Bay Area reports: Due to a recent baby boom, the average age of the Bay Area population has come down to 30 years. Moreover, since there is a trend for people to have children later in life, the fraction of people older than 50 years of age is 65% ...

Can this be accurate?

2. Let X_i, i = 1,2,...,1000 be i.i.d Bernoulli random variables with

$$P(X_1 = 1) = 1/1000.$$

Let $S = \sum_{i=1}^{1000} X_i$. Establish one of the following bounds.

Note: The stronger the bound, the higher the points you receive.

(a) $P(S > 600) < 1/600$	(40 points)
(b) $P(S > 600) < 1/599^2$	(60 points)
(c) $P(S > 600) < e^e/e^{600}$	(80 points)