Solution for exercise 3.3.14 in Pitman

Question a) Markov's inequality

$$P(X \geq 50,000) \leq \frac{E(X)}{50,000} = \frac{1}{5}$$

Question b) Chebychevs inequality

$$P(|X - E(X)| \geq kSD(X)) =\leq \frac{1}{k^2}$$

we have $k = 5$ such that the probability is bounded by $\frac{1}{25}$. The bound provided by Chebychevs inequality is much sharper than the one provided by Markov's inequality.