

STAT/MA 41600
In-Class Problem Set #41: November 28, 2018
Solutions by Mark Daniel Ward

Problem Set 41 Answers

- 1.** Let X denote the waiting time. The Markov inequality implies $P(X > 8) \leq 6.3/8 = 0.7875$.
- 2a.** Let X denote the height. By the Markov inequality, we have $P(X \geq 6) \leq 5.2/6 = 0.86667$.
- 2b.** By the Chebyshev inequality, we have $P(|X - 5.2| > .2) \leq (0.05)^2/ (.2)^2 = 0.0625$.
- 3a.** Let X denote the salary. By the Markov inequality, we have $P(X \geq 50,000) \leq 47,500/50,000 = 19/20 = 0.95$.
- 3b.** By the Chebyshev inequality, we have $P(|X - 47,500| > 2500) \leq (1000)^2/(2500)^2 = 4/25 = 0.16$.
- 4.** Among the 40 selected students, let X denote the number that were close enough to have seen the clock fall. Then X is a Binomial random variable with $n = 40$ and $p = 0.02$. So the desired probability is $P(X \geq 2) = 1 - P(X = 0) - P(X = 1) = 1 - \binom{40}{0}(0.02)^0(0.98)^{40} - \binom{40}{1}(0.02)^1(0.98)^{39} = 0.1905$.