1. Suppose that the waiting time for the next Facebook message to arrive has an expected value of 2 minutes.

1a. Find an upper bound on the probability that the waiting time is 3.5 minutes or longer.

1b. If we are told that the waiting time has an exponential distribution, what is the exact probability that the waiting time is 3.5 minutes or longer?

1c. If we assume, as in **1b**, that the waiting time is exponential, then what is the variance of the waiting time?

2. Every day at 7 PM, you begin waiting for your significant other to arrive. The waiting time is random, with an average of 20 minutes and standard deviation of 5 minutes. Find a bound on the probability that your significant other arrives between 7:10 PM and 7:30 PM.

3 (review). Suppose that it is 9:30 AM. We begin waiting for Alejandra and Bruno to arrive. Their arrival times are independent. Let X and Y (respectively) denote the times, given in minutes after 9:30 AM until they arrive. Suppose that X and Y are exponential random variables, with $\mathbb{E}(X) = 5$ and $\mathbb{E}(Y) = 7$. Find the probability that they arrive within 3 minutes of each other.

4 (review). Suppose that the point (X, Y) is chosen uniformly at random in the rectangle with corners at the points $(0,0)$, $(6,0)$, $(6,4)$, and $(0,4)$. Find $P(|X - Y| \leq 1)$.