A. FROM TEXTBOOK CHAPTER FIVE:

1. Problems: 14, 17, 33
2. Theoretical Exercises: 9, 12, 15, 19, 29, 30

B. At time zero, a single bacterium in a dish divides into two bacteria. This species of bacteria has the following property: after a bacterium $B$ divides into two new bacteria $B_1$ and $B_2$, the subsequent length of time until each $B_i$ divides is an exponential random variable of rate $\lambda = 1$, independently of everything else happening in the dish.

1. Compute the expectation of the time $T_n$ at which the number of bacteria reaches $n$.
2. Compute the variance of $T_n$.
3. Are both of the answers above unbounded, as functions of $n$? Give a rough numerical estimate of the values when $n = 10^{50}$.