MATH 10B, SPRING 2017, QUIZ 7

(1) Suppose you draw five cards from a standard deck of 52.
  (a) What is the probability that you get exactly three red cards?

  (b) Now suppose that if you don't get exactly three red cards, you replace all five cards, reshuffle the deck, and try again. You keep doing this until you do get exactly three red cards. What is the probability that you have to repeat this exactly seven times?

(2) Suppose X and Y are independent random variables such that $E[X] = 2$, $E[Y] = -3$, $\mathrm{Var}[X] = 1$, and $\mathrm{Var}[Y] = 4$. Find each of the following:
  - $E[X^2] =$

  - $E[X + Y] =$

  - $E[XY] =$

  - $\mathrm{Cov}[X, Y] =$

  - $\mathrm{Var}[X + Y] =$