CSCI 281, Assignment 12 – Probability (30 points)

1. An ordinary deck of cards contains 52 cards divided into four *suits*. The *red suits* are diamonds (♦) and hearts (♥). The *black suits* are clubs (♣) and spades (♠). Each suit contains 13 cards of the following *denominations:* 2, 3, 4, 5, 6, 7, 8, 9, 10, J (jack), Q (queen), K (king), and A (ace). The cards J, Q, and K are called *face cards*. Suppose the deck of cards is thoroughly shuffled so that when you draw the top card, every card is equally likely to be on top.
   (a) (5 points) What is the sample space of the possible outcomes?
   (b) (5 points) What is the event that the chosen card is a black face card?
   (c) (5 points) What is the probability that the chosen card is a black face card?
   (d) (5 points) Suppose you first draw a red card and then draw a second card. What is the probability that the second card will also be a red card?
2. Now suppose you draw two cards instead of just one.
   (a) (5 points) What is the sample space of this new experiment?
   (b) (5 points) Suppose your first card is red. What is the probability that the second card will also be red?