Directions: Each exercise asks you to count something related to a standard deck of cards. If you are not familiar with a standard deck, try googling "standard deck of 52 cards." Show your work.

1. Two cards are drawn from a deck, a first card and a second card.
a) Assuming that the first card is replaced before the second is drawn (with replacement), count how many possible outcomes there are. Show how to get your answer by using the basic counting principle and then show how to get your answer using functions. (Hint: When using functions, think of functions with domain $\{1,2\}$.)
b) Now suppose you do not replace the first card before the second is drawn. How many different ways can the cards be drawn? Explain your answer using the basic counting principle and then using functions.
2. Now suppose that several cards are drawn from a standard deck and the outcome is an ordered list of the cards drawn.
a) How many different ways can three cards be drawn if you replace the cards before drawing the next? Again, explain your answer in two ways.
b) How many different ways can three cards be drawn if you do not replace the cards before drawing the next? Explain your answer in two ways.
c) How many different ways can $n$ cards be drawn if you replace the cards before drawing the next? Explain in two different ways.
d) How many different ways can $n$ cards be drawn if you do not replace the cards before drawing the next? Explain in two different ways.
3. Two cards are drawn without replacement from a standard deck and the outcome is an ordered list of the two cards drawn.
a) How many outcomes are there if the first card is a club and the second card is not a club?
b) How many different outcomes are there if the first card is a club and the second card is a club?
c) How many different outcomes are there if the first card is a club?
d) How many outcomes are there if the two cards are from different suits?
