Math 2001 - Assignment 5

Due October 2, 2015

(1) [1, Section 3.1]: Exercise 3
(2) [1, Section 3.1]: Exercise 4
(3) How many standard Colorado license plates (3 numbers followed by 3 letters) have at least one number or letter repeated?
(4) How many different 5-card hands form a Full House? Pick 5 cards from a standard 52-card deck such that 3 are of a kind and the remaining 2 are of a kind.
(5) How many 4-letter "words" can you form from the alphabet $A, \ldots, Z$ if
   (a) repetitions are not allowed and the letters are in alphabetical order, e.g., BFOS,
   (b) repetitions are not allowed and the letters need not be ordered,
   (c) repetitions are allowed and the letters need not be ordered,
   (d) repetitions are allowed and the letters are in alphabetical order, e.g., BFFS.
(6) Give 2 reasons why the following is true for $k, n \in \mathbb{N}$ with $0 \leq k \leq n$:
$$\binom{n}{k} = \binom{n}{n-k}$$

References

[1] Richard Hammack. The Book of Proof. Creative Commons, 2nd edition, 2013. Available for free: `http://www.people.vcu.edu/~rhammack/BookOfProof/`