For the questions below, give your answers as integers in the usual base 10 expansion. That is, don’t give a final answer like $6 \cdot \binom{10}{2} \cdot 3!$, give it as 1620.

1. (a) How many strings of length 4 can be made from the letters $ABCDEF$ (using letters as many times as you want)?
   (b) How many such strings begin with the letters $DA$?
   (c) How many such strings (as in (i)) have at most two As?
   (d) How many such strings (as in (i)) have no repeated letters (i.e., at most one A, at most one B, and so forth)?
   (e) How many such strings (as in (i)) have at most one repeated letter?
   (f) How many such strings (as in (i)) begin and end with a vowel?

2. This question refers to hands of cards drawn from a standard deck of 52 cards.
   (a) How many 5-card hands have two pairs (of different ranks), but not three of a kind? (Note: A “pair”, also known as “two of a kind”, consists of two cards of the same rank)
   (b) How many 5-card hands have three of a kind and a pair of a second kind?
   (c) How many 5-card hands have all the same suit?
   (d) How many 5-card hands contain the queen of spades?
   (e) How many 5-card hands do not contain any spades?
   (f) How many 5-card hands have five in a row (e.g., 7-8-9-10-J-Q)? Here the ace $A$ can count as coming before 2 or after $K$.
   (g) How many 7-card hands have four of a kind?
   (h) How many 5-card hands have at least three queens?

3. (a) How many different strings can be made by rearranging the letters of the word MISSISSIPPI?
   (b) How many of these strings have all of the $I$s together?
   (c) How many of these strings (as in (i)) start with the letters $MI$?
   (d) How many of these strings (as in (i)) contain the substring “SMIP”?
   (e) How many of these strings (as in (i)) do not have the two $P$s next to each other?