Solve the following Problems:

A.   Twenty applicants for a secretary position are to be interviewed to narrow the list of candidates to the top five.   How many possible results are there if
a) the top five are ranked in order of preference?
b) the top five are unranked?

B.   Six speakers are scheduled to address a group of College students.   In how many different orders can the speakers appear?

C.   From a group of 8 teachers, a committee of at least one and at most three persons is to be formed.   How many different committees can be formed?

D.   In Rapid City South Dakota, there are 10 dogs racing for first and second prize.   How many possible outcomes are there?

E.   If two cards are chosen at random from a standard deck of playing cards, how many different ways are there to draw the two cards if at least one card is a jack, queen or a king?

F.   If three cards are chosen at random from a standard deck of playing cards, how many different ways are there to draw the three cards if at least two cards are a jack, queen or a king?

G.   If there are 8 orange bars, 9 red bars and 5 blue bars, how many different ways are there to give a person 2 orange bars, 3 red bars and 1 blue bar?

H.   How many different ways are there to draw 6 cards from a standard deck of cards and obtain 4 kings and 2 jacks?

I.   There are 20 scholarships which are the same to be given to students at West Mount High. How many ways are there for 5 students to win the scholarships?

J.   In how many different ways can the letters of the work HOUSE be arranged?

K.   A company has divided a state into eight regions.   It wishes to test a product in three of these regions.   How many different ways are there to select these three regions?

L.   The chocolate factory classifies its candies as caramels (10 types), chocolate (7 types), and dark chocolate (8 types).   A customer has ordered an assortment to consist of six types of caramels, four types of chocolate, and five types of dark chocolates.   How many such assortments are possible?

M.   A five member committee is to be selected from among four Math teachers and five English teachers. In how many different ways can the committee be formed under the following circumstance?
A) Anyone is eligible to serve on the committee.

B) The committee must consist of 3 Math teachers and 2 English teachers.
C) The committee must contain at least three Math teachers.
D) The committee must contain at least three English teachers.

Answers:
A. 1,860,480,   15,504
B. 720
C. 92
D. 90
E. Let the set of jack, queen, king be called set A.   There are 12 cards in this set.
Let the other cards be set B.   There are 40 cards in this set.
Draw two cards.   S = {1 card from set A and 1 card from set B, or both cards from set A, or ...
S = {AB, AA, BB}
We want at least one from set A, so find AB or AA.
$C(40,1)*C(12,1) + C(12,2) = 546$
F. 2925
G. 11,760
H. 6
I. 15,504
J. 120
K. 56
L. 411,600
M. 126, 40, 41, 81