

ON MY HONOR, I HAVE NEITHER GIVEN NOR RECEIVED ANY AID ON THIS WORK, NOR AM I AWARE OF ANY BREACH OF THE HONOR CODE THAT I SHALL NOT IMMEDIATELY REPORT.

Pledged: _____

Print Name: _____

1. A pool of twenty workers are available to perform ten different jobs. (Each job requires just one worker.) How many assignments of workers to jobs are possible?
2. Several states, including Virginia and New York, issue license plate with the format ABC-1234 – in other words the first three characters are capital letters, and the last four are digits.
 - (a) How many license plates are there with this format?
 - (b) Unlike Virginia, New York has reserved plate numbers AAA-0000 through FAA-0999 for state use. How many such reserved plates are there?
3. If 4 Americans, 3 Frenchmen, and 5 Britons are to be seated in a row, how many seating arrangements are possible if people of the same nationality must sit next to each other?
4. Find an *elementary function* $f(x)$ that grows faster than $n!$. (An elementary function is a finite combination of polynomials, trig functions, and exponential/logarithmic functions. Basically, these are the kinds of functions that are seen in a first course in calculus.) If you can, make sure your function grows much faster than $n!$, in the following sense:

$$\lim_{n \rightarrow \infty} \frac{n!}{f(n)} = 0$$

5. A president, treasurer, and secretary, all different, are to be chosen from a club consisting of 10 people. How many such choices are there if
 - (a) there are no restrictions?
 - (b) A and B will not serve together?
 - (c) C and D will serve together or not at all?
 - (d) E must be an officer?
 - (e) F will serve only if he is president?
6. A campus club has 4 freshmen, 5 sophomores, 3 juniors, and 6 seniors. The club wants to choose a delegation of size 4 to speak to the college president. How many possible selections are there if
 - (a) there are no restrictions?
 - (b) at least one senior must be chosen?
 - (c) no more than one freshman may be chosen?
 - (d) two juniors and two seniors must be chosen?
 - (e) one member of each class must be chosen?
7. Six identically wrapped gift boxes are in a row. Two contain sackcloth and ash, three contain twenty dollar bills, and one contains a hundred dollar bill. How many possible arrangements of these gifts are there?
8. Five digit numbers are to be formed from the digits 1, 2, \dots , 9. How many such numbers are there if
 - (a) there are no restrictions?
 - (b) no digit can be repeated?
 - (c) exactly one digit is repeated? (e.g. 31235)

9. Twelve antennae are arranged in a row. The antennae are identical, except that three of them are not functioning. Suppose the array of antennae will still function correctly provided that none of the defective antennae are adjacent to each other. How many functioning arrangements of the twelve antennae are there?
10. Starting at point A in the graph below, you can move at each step either one unit to the right, or one unit up.
- (a) How many such paths from A to B are there?
- (b) How many such paths from A to B also pass through the point P ?

