NOTA means "None of these answers is correct."

1. I have 10 different math books (3 Calculus, 4 Probability and 3 Geometry) and I want to put them on a shelf keeping the books from a common topic together. In how many ways can this be done?
   A) (3!)(3!)(4!)(3!) B) 10! C) $\frac{10!}{3!4!3!}$ D) (3!)(4!)(3!) E) NOTA

2. How many positive 5-digit even numbers are there?
   A) 33333 B) 45000 C) 50000 D) 90000 E) NOTA

3. How many positive 5-digit numbers have their digits in strictly decreasing order (74321 yes; 56421 and 95211 no)?
   A) 11 B) 126 C) 252 D) 15120 E) NOTA

4. How many positive integer factors are there of the number 240?
   A) 10 B) 16 C) 20 D) 24 E) NOTA

5. How many rectangles can be formed by connecting 4 vertices of a regular octagon?
   A) 3 B) 6 C) 24 D) 140 E) NOTA

6. How many right triangles can be formed by connecting 3 vertices of a regular octagon?
   A) 8 B) 16 C) 24 D) 32 E) NOTA

7. How many distinct permutations of the letters in the word "SACRAMENTO" are there?
   A) 9! B) 5(9!) C) 9(9!) D) 10! E) NOTA

8. How many distinct three-letter permutations can be formed using the letters "SACRAMENTO", for example "SAC" and "RAM".
   A) 504 B) 528 C) 648 D) 720 E) NOTA

9. Traveling from the origin (0,0) in the xy-plane, we take either horizontal or vertical steps to another lattice point, one unit away. For example, from (0,0), one could go to (1,0), (0,1), (-1,0) or (0,-1). How many paths lead to (4,4) in 8 steps?
   A) 70 B) 128 C) 256 D) 320 E) NOTA

10. Again we travel from (0,0) to the point (4,4) using 1 unit horizontal or vertical steps. How many paths of length 10 are there?
    A) 1024 B) 1260 C) 1280 D) 2520 E) NOTA

11. Finally, in traveling from (0,0) to the point (4,4), each step may move 1 unit horizontally, 1 unit vertically or 1 long-unit diagonally; that is, from (0,0) we may also go to (1,1). How many such paths are there with 6 steps?
    A) 15 B) 64 C) 70 D) 81 E) NOTA

12. In how many ways can 10 identical Blue balloons be divided among Amy, Brian and Carol? There is no guarantee that any given child will receive any balloons.
    A) 36 B) 48 C) 60 D) 78 E) NOTA

13. Ten balloons (3 red, 3 white, and 4 blue) are divided among Amy, Brian and Carol. How many ways can this done if any child may not receive a balloon and different combinations of colors are considered different divisions?
A) 3 B) 192 C) 864 D) 1500 E) NOTA

14. What is $\binom{2}{0}+\binom{3}{1}+\binom{4}{2}+\ldots+\binom{11}{9}$?
A) 220 B) 243 C) 256 D) 300 E) NOTA

15. How many terms will be in the expansion of $(x+y+z)^6$, once it is simplified (like terms combined)?
A) 12 B) 18 C) 36 D) 56 E) NOTA

16. Five teachers were assigned seats in a row for graduation. Instead of checking their assignment, they sat down in a random seat. In how many ways can they be seated so that exactly two of them are in their assigned seat?
A) 10 B) 20 C) 30 D) 60 E) NOTA

17. If a coin is flipped 8 times, there are 256 possible sequences of heads and tails. How many of those sequences have the first occurrence of three consecutive heads at flips 6, 7 and 8?
A) 13 B) 16 C) 32 D) 63 E) NOTA

18. Suppose eight friends are riding a circular merry-go-round with 8 identical horses that are arranged in pairs around the perimeter of the ride. How many different (from an observer next to the ride) ways can they seat themselves?
A) 512 B) 10080 C) 20160 D) 40320 E) NOTA

19. Fred has 4 kinds of fruit and 3 kinds of vegetables in his refrigerator. If he picks all different kinds of food, how many combinations of food can he eat to get his 5 servings of fruit and/or vegetables?
A) 3 B) 12 C) 21 D) 2520 E) NOTA

20. Fred's brother, Pete also has 4 kinds of fruit and 3 kinds of vegetables. Pete, though, is free to have up to two servings of the same food. In how many ways can Pete pick his 5 servings of fruit and/or vegetables?
A) 42 B) 266 C) 2002 D) 2520 E) NOTA

21. How many positive five-digit integers can be made from the digits 1 through 9 (using each digit at most once) so that of the digits used, 5 is the median?
A) 36 B) 120 C) 3024 D) 15120 E) NOTA

22. In how many ways can the number 12 be expressed as the sum of three distinct positive integers (irrespective of order)?
A) 5 B) 6 C) 7 D) 8 E) NOTA

23. I have 4 boxes A, B, C and D, each capable of holding up to two balls. How many ways can I distribute 5 balls among the 4 boxes?
A) 4 B) 16 C) 24 D) 120 E) NOTA

24. The sequence of letters AABBCC can be permuted in 6!/(2!2!2!)=90 ways. In how many of these will the sequence of letters "ABC" be found?
A) 18 B) 22 C) 23 D) 24 E) NOTA

25. There are many distinguishable ways to permute the letters in the word "SEATTLE". If we listed out all of the possible ways in alphabetical order starting with "AEELSTT" what would be the $900^{th}$ word?
A) STLETAE B) STTLEEA C) TAEELST
D) TAEELTS E) NOTA

26. I roll 5 indistinguishable six-sided dice as in the game Yahtzee. In how many ways can the dice be rolled so that the numbers showing are all different but there is not a straight (12345 or 23456 in some permutation)?
A) 120 B) 240 C) 718 D) 720 E) NOTA

27. Let S = {A, B, C, D, E, F, G}. How many subsets of S contain A as a member but not B?
A) 32 B) 48 C) 64 D) 120 E) NOTA

28. There are 28 dominos in a standard set, each domino has two sides, and each side has from 0 to 6 "dots." A 3-4 domino can be reversed to get the 4-3 domino. How many ways are there to choose 2 dominos that have at least one number in common?
A) 147 B) 168 C) 189 D) 378 E) NOTA

29. Bob has 5 dogs and 5 cats and they enter the house one-by-one. If there are ever more dogs than cats in the house, there is trouble. How many of the possible permutations of entry order (i.e. CCCDCDDCDD) are there such that there are never more dogs than cats in the house?
A) 24 B) 42 C) 210 D) 256 E) NOTA

30. There are ten students in a class, 6 boys and 4 girls. How many ways are there to select a committee of 4 students that has at least 2 girls?
A) 11 B) 72 C) 90 D) 115 E) NOTA