Nassau County Interscholastic Mathematics League

Contest # 6

Answers must be exact or must have 4 (or more) significant digits, correctly rounded, unless otherwise noted

2000-2001

Calculators allowed

Problems 25-26. Time limit 10 minutes.

25. Let $sp(n) = \textit{the sum of all the prime factors of } n$. Find the value of $sp(2001) - sp(2002)$

26. The kite NCIM has right angles at N and I and its diagonals meet at L. If CL:LM = 1:4, and length NI = 24, find the area of the kite.

Problems 27-28. 10 minutes.

27. (a classic) Express the product of the twenty-six factors $(x-a)(x-b)(x-c)(x-d)\cdots(x-y)(x-z)$ in simplest form

28. A car travels due north for 8 miles, then turns 45° towards the east and goes $16\sqrt{2}$ miles northeast. How far (straight-line distance) is the car from its starting point?

Problems 29-30. 10 minutes.

29. The axes on a graph are labeled with x on the horizontal axis and $\log_8 y$ on the vertical axis. The graph of the set of ordered pairs of the form $(x, \log_8 y)$ on this unusual set of axes is a line containing the points $(2,6)$ and $(4,9)$. If y is written as a function of x, $y = a \cdot 2^{bx}$. Find the ordered pair (a,b)

30. Find the last (i.e. rightmost) three digits in the expansion of 3^{2001}.
