

Nassau County Interscholastic Mathematics League  
Answers must be in simplest exact form, unless otherwise noted.  
Calculators are allowed.

Contest #4

2008-2009

**Time: 10 minutes**

19. Steve calculated the tip for his restaurant dinner by doubling the tax and adding \$4. His dining rewards program reimburses him 18% of the total cost for his dinner, including tax and tip. If the tax rate is 8% and Steve received \$17.46 in reimbursement, compute the exact percent of the pre-tax cost of the dinner he left for a tip.

20. The turning point of a parabola is (2,-5). The point (5,22) also lies on the graph of the parabola. Write an equation of the parabola in the form  $y = ax^2 + bx + c$ ,  $a \neq 0$ .

**Time: 10 minutes**

21. Ivan invested money in a stock. For the first three days of his investment, the stock decreased in value at the rate of 6% per day. Over the next eight days, it increased in value daily at a constant rate. At the end of these eleven days, Ivan had earned 15% on his original investment. Compute, to the nearest ten thousandth, the daily percent of increase over the eight days of increase during the eleven-day interval.

22. One of the integers from 1 through 40 is chosen at random. Compute the probability that the integer is a prime or a multiple of 7 or has the digit "7" in it.

**Time: 10 minutes**

23. Compute the smallest number that is not a solution to the inequality  $\left| \frac{x+4}{x-3} \right| < 2$ .

24. Compute the sum of the cubes of the roots of the equation  $x^2 - 41x + 557 = 0$ .