

NASSAU COUNTY INTERSCHOLASTIC MATHEMATICS LEAGUE

2007 – 2008

Acceptable Calculators Allowed

Contest #2

The degree of accuracy will be specified in the problem.

Problems 7-8. 10 minutes

7. Compute the units' digit in the quotient  $\frac{72^{153}}{96^{49}}$ .

8. The area of a sector in a circle of radius 12 cm is equal to the area of a sector in a circle of radius 8 cm. If the central angle of the sector of the smaller circle measures  $112.5^\circ$ , compute the degree-measure of the central angle of the sector in the larger circle.

---

Problems 9-10. 10 minutes

9. If  $w^2 - w - 2.5 = 0$ , compute the numerical value of  $w^4 - 2w^3 + 7w^2 - 6w - 1.25$ .

10. The perimeter of a rectangle is 20 cm more than twice the length of its diagonal. The difference in length between the longer dimension and the shorter dimension of the rectangle is 14 cm less than the length of its diagonal. Compute the total number of square centimeters in the area of the rectangle.

---

Problems 11-12. 10 minutes

11. Two numbers have a sum of 6 and a product of 10. Compute the sum of the reciprocals of their squares.

12. On the Cartesian plane, a lattice point is one for which both coordinates are integers. The lattice point in quadrant I on the graph of  $10x + 7y = 2007$  whose x-coordinate is the greatest is (200, 1). Determine the lattice point in quadrant I on the graph whose x-coordinate is the least.