Nassau County Interscholastic Mathematics League

Team Contest Answers must be in simplest exact form, unless otherwise noted. 2008-2009

Calculators are allowed.

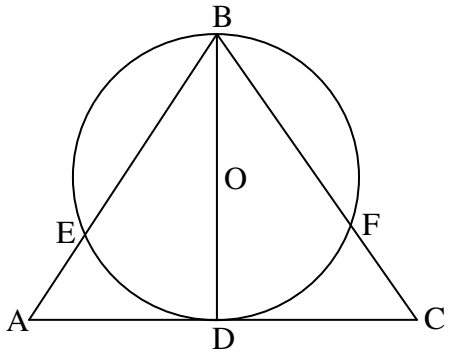
Time: 40 minutes

T1. Compute, to the nearest tenth, the area of a regular pentagon with a side of length 14.

T2. If $\log_{12}5 = x$ and $\log_{12}4 = y$, express $\log_3 500$ in terms of x and y.

T3. Four marbles are drawn at random from an urn containing five red marbles and four green marbles. Without noting the color of the four marbles drawn or returning them to the urn, four red marbles are added to the five remaining marbles in the urn. One marble is then drawn at random from the urn. Compute, as a fraction in simplest form, the probability that the last marble drawn is green.

T4. $\overline{BD}$ is a diameter in circle O and an altitude of equilateral Δ ABC as shown in the diagram below. The area of $\Delta ABC = 12\sqrt{3}$. Compute, to the nearest thousandth or in simplest exact form, the area of the region bounded by chord $\overline{BE}$, chord $\overline{BF}$, and $\overset{\frown}{EBF}$.



T5. If $x^5 - x^3y^2 + x^2y^3 - y^5 = 52(x - y)$, $xy = 3$, and $x \neq y$, compute all possible real values of the quantity $x + y$.

T6. In Δ ABC, E is the midpoint of side $\overline{BC}$, F is a point on side $\overline{AC}$ such that CF:FA = 4:5 and D is the point of intersection of $\overline{AE}$ and $\overline{BF}$. Compute AD:AE.