Nassau County Interscholastic Mathematics League

Contest # 2 **2002-2003**

Calculators Allowed

Problems 7-8. Time limit: 10 minutes.

7. Four men in a room are each accused of a crime.
   - If the statement "All of the men are guilty" is false
   - and the statement "All of the men are innocent" is false,
   - and the statement "An odd number of men are guilty" is false,

how many of the men are guilty?

8. In triangle ABD, point C is on the segment between A and D so that $\angle ABC \cong \angle CBD$.
Given lengths AB = 6, BD = 9, and AD = 10, find length AC

Problems 9-10. Time limit: 10 minutes.

9. A polynomial has degree 4 and the y-intercept of its graph is –48. The coefficient of its 4^{th} degree term is –2. It has four x-intercepts, three of which are 4, -3, and $\frac{1}{2}$. Find the fourth x-intercept.

10. a, b, and c are real numbers. The average of a and b is c. The average of a and c is one more than b. The average of b and c is two more than twice a. Find the value of c.

Problems 11-12. Time limit: 10 minutes.

11. Several married couples attend a party. Everyone shakes hands once with each person at the party except themselves and their spouse. If 40 handshakes took place, how many couples were at the party?

12. A positive integer leaves
   - a remainder of 7 when divided by 8,
   - a remainder of 5 when divided by 6,
   - a remainder of 3 when divided by 4,
   - and a remainder of 1 when divided by 2. Find the least such positive integer.

Answers.

7. 2 8. 4

9. –4 10. $\frac{-11}{3}$

11. 5 12. 23