MASSACHUSETTS MATHEMATICS LEAGUE
CONTEST 6 – MARCH 2011
ROUND 1 ALG 2: SIMULTANEOUS EQUATIONS AND DETERMINANTS

ANSWERS

A) _____

B) (_____ , _____)

C) (_____ , _____ , _____)

******* NO CALCULATORS ON THIS ROUND *******

A) Find <u>all</u> ordered pairs (x, y) which satisfy the system $\begin{cases} 5x - 11y = 96 \\ x^2 - y^2 = 0 \end{cases}$.

B) Given: the matrix $\begin{bmatrix} x & 2 \\ x+1 & 10-x \end{bmatrix}$

Compute the ordered pair (x, M), where x is the value for which the determinant of this matrix attains its maximum value .

C) Let $P(a, b, c)$ be the point in the plane $3x + 2y - z = 6$ which is also in the xy-plane and <u>closest</u> to the origin (0, 0, 0). Determine the ordered triple (a, b, c).

Note: The xy-plane is the plane containing the shaded region.