MASSACHUSETTS MATHEMATICS LEAGUE
CONTEST 2 – NOVEMBER 2010
ROUND 1 COMPLEX NUMBERS (No Trig)

ANSWERS

A) _____

B) (_____ , _____)

C) _____ sq. units

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

A) Compute: $\left(\frac{1-i}{1+i}\right)^{2010}$

B) Find the ordered pair (x, y) of real numbers that satisfy the equation

$$(x^2 - x - 5) + i(y^2 - 7y + 3) = 1 - 7i$$

and for which $y - x$ is as large as possible.

C) The complex numbers $(1 + i)$, $(-1 + i)$, $(-1 - i)$ and $(1 - i)$ form a square when plotted in the complex plane. If each of these numbers is multiplied by $(1 + i)$, a new figure is formed. Compute the area of the new figure.

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