

MASSACHUSETTS MATHEMATICS LEAGUE
CONTEST 2 – NOVEMBER 2008
ROUND 1 COMPLEX NUMBERS (No Trig)

ANSWERS

A) (_____ , _____)

B) (_____ , _____)

C) _____

A) In simplified form, $\frac{1 - \frac{1}{\sqrt{-6}}}{\sqrt{-2}} - \left(\frac{1 - \sqrt{-2}}{2} \right)^2$ may be expressed as $\frac{A\sqrt{3} + B}{12}$.

Determine the ordered pair (A, B) .

B) $(\sqrt{2} + i\sqrt{3})^{600} \cdot (\sqrt{2} - i\sqrt{3})^{600}$ may be expressed as A^B in many ways, where A and B are positive integers. If A is the largest possible three-digit integer, determine the ordered pair (A, B) .

C) If $\frac{2x + yi}{2 + i} = \frac{5}{5 + i}$, compute $x + y$, where x and y are real numbers.