

MASSACHUSETTS MATHEMATICS LEAGUE  
NOVEMBER 2005  
ROUND 1 COMPLEX NUMBERS

ANSWERS

A) \_\_\_\_\_

B) \_\_\_\_\_

C) \_\_\_\_\_

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A) If  $x = a + bi$  for real  $a$  and  $b$  and if  $x^2 = i$  find the product  $ab$ .

B) Simplify  $(i^9 - 5i^6 - 3i^8 + 7i^{11})^2$  as much as possible.

C) Express in simplest form  $(\sqrt{-6} - \sqrt{-2})^2 + \frac{16i}{1 + \sqrt{-3}} - \left(\frac{4}{\sqrt{-2}}\right)^2$