

MASSACHUSETTS MATHEMATICS LEAGUE

NOVEMBER 2003

ROUND 1: COMPLEX NUMBERS

ANSWERS

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

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

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

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A) Calculate  $\underset{\substack{\downarrow \\ (a \times b)}}{ab}$  when  $\frac{5}{4 + 3i}$  is in simplified  $a + bi$  form.

B) Calculate the absolute value of :  $\frac{-2\sqrt{3} + 6i}{-\sqrt{2} - i\sqrt{2}}$  in simplified radical form.

C) Find the imaginary roots of the equation  $x^4 + x^3 - 6x^2 - 14x - 12 = 0$