

MASSACHUSETTS MATHEMATICS LEAGUE  
NOVEMBER 2004  
ROUND 1 COMPLEX NUMBERS

ANSWERS

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

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

C) (\_\_\_\_\_, \_\_\_\_\_)

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A) Find the exact value of  $xy$  if  $(2 + i)^3 = 6x + 5yi$  with  $x$  and  $y$  real numbers

B) For a complex number  $z$  and its conjugate  $\bar{z}$  with  $|z| = c$ ,  $\frac{25}{z} + \frac{\bar{z}}{c^2} = 3 - 2i$ . Express  $z$  in  $a+bi$  form

C) Find all complex numbers  $x$  satisfying  $x^2 = -2 + 8i\sqrt{3}$ . Express answers in  $a + bi$  form.