

**MASSACHUSETTS MATHEMATICS LEAGUE  
CONTEST 3 - DECEMBER 2008 ANSWERS**

**Round 1 Trig: Right Triangles, Laws of Sine and Cosine**

- A)  $\frac{15}{17}$                       B) 50                      C)  $40 + 8\sqrt{3}$  or  $8(5 + \sqrt{3})$

**Round 2 Arithmetic/Elementary Number Theory**

- A) 158400                      B) (2, 2, 5, 1)                      C)  $ACBBAA_3$

**Round 3 Coordinate Geometry of Lines and Circles**

- A) (8, -12, -9)                      B) 3                      C) (3, 6)

**Round 4 Alg 2: Log and Exponential Functions**

- A)  $\frac{9}{256}$                       B) -1                      C)  $2/3, 2$

**Round 5 Alg 1: Ratio, Proportion or Variation**

- A) -13                      B)  $\frac{256}{9}$                       C)  $\frac{8}{17}$

**Round 6 Plane Geometry: Polygons (no areas)**

- A) 8                      B) 7 : 2                      C) 15

**Team Round**

- A) 2, 4                      D) 11:30 pm  
B) 81926                      E) 17  
[ smallest: 11713    largest: 70213 ]  
C)  $(-1, \sqrt{2})$                       F) 0