

**MASSACHUSETTS MATHEMATICS LEAGUE
CONTEST 3 - DECEMBER 2009 ANSWERS**

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

- A) 120 meters B) 1 C) $\frac{3\sqrt{3}-\sqrt{7}}{8}$

Round 2 Arithmetic/Elementary Number Theory

- A) 380% B) 2394 C) (0, 6) [904365]

Round 3 Coordinate Geometry of Lines and Circles

- A) (5, 3), (-1, -5) B) -0.5, 12.3 C) $9x - 7y - 11 = 0$ [R(16, 19)]

Round 4 Alg 2: Log and Exponential Functions

- A) $-\frac{1}{2}$ B) $2\sqrt{2}$ C) -2

Round 5 Alg 1: Ratio, Proportion or Variation

- A) $\frac{7}{2}$ B) 36 C) 9.6

Round 6 Plane Geometry: Polygons (no areas)

- A) 60 B) 882 C) 3080

Team Round

- A) 15 D) $\sqrt{2+\sqrt{5}}$
B) 354482 E) 56
C) 4 F) 5 or 7