MASSACHUSETTS MATHEMATICS LEAGUE
CONTEST 3 - DECEMBER 2014 ANSWERS

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

    A) 450, 468   B) $\left(5, \dfrac{3\sqrt{2}}{5}\right)$ C) $-\dfrac{1}{26}$

Round 2 Arithmetic/Elementary Number Theory

    A) 6   B) 55   C) 324

Round 3 Coordinate Geometry of Lines and Circles

    A) Center: (8, −5) radius: 10   B) $\left(-\dfrac{13}{5}, \dfrac{2}{5}\right)$ C) (4, 91)

Round 4 Alg 2: Log and Exponential Functions

    A) 16   B) $\dfrac{\log_5 13}{2}$ or $\log_5 \sqrt{13}$ C) $8, \dfrac{1}{2}$

Round 5 Alg 1: Ratio, Proportion or Variation

    A) 5   B) $\left(\dfrac{8}{5}, 90\right)$ C) 105

Round 6 Plane Geometry: Polygons (no areas)

    A) 154   B) $\dfrac{4}{5}$ C) (33, 8, 2)

Team Round

    A) 4   D) 39322

    B) 80   E) 1 : 1

    C) 0, –2, 3, –5   F) 240, 90, 48, 30, 15, 9, 6, 2
                                          (8 values)