MASSACHUSETTS MATHEMATICS LEAGUE
CONTEST 3 - DECEMBER 2016 ANSWERS

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

A) 504 B) $\dfrac{4}{3}$ C) $\sqrt{7}$

Round 2 Arithmetic/Elementary Number Theory

A) (9, 27) B) 3 C) 0

Round 3 Coordinate Geometry of Lines and Circles

A) 20 B) $(2,3)$ C) 20

Round 4 Alg 2: Log and Exponential Functions

A) 500 B) 16 C) $x < -1,\ -1 < x < 0,\ x > 1$

Round 5 Alg 1: Ratio, Proportion or Variation

A) 230 B) $\dfrac{8}{3}$ C) 27

Round 6 Plane Geometry: Polygons (no areas)

A) 15 B) obtuse C) $\left(5\sqrt{15},\, 1+\sqrt{51}\right)$

Team Round

A) $(4,2,2)$ D) $\dfrac{2N}{N-1}$

B) (−2, −3) and (3, 2) E) $\left(2,\ 2+2\sqrt{5}\right)$

C) $\left(-3+\sqrt{2},0\right)$ F) $(8,6,2)$