**MASSACHUSETTS MATHEMATICS LEAGUE**
**CONTEST 1 - OCTOBER 2010**
**ROUND 7 TEAM QUESTIONS**
**ANSWERS**

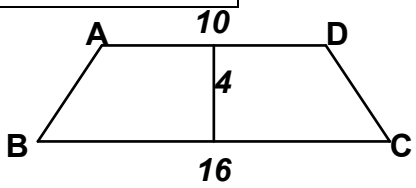
A) _____ D) ( _____ , _____ )

B) _____ E) _____

C) ( _____ , _____ ) F) _____

******* NO CALCULATORS ON THIS ROUND ******

A) The following diagram is the cross-section of the frustum of a right circular cone. Compute the total surface area.




B) Right triangle $ABC$ has legs 6 and 8. The altitude to the hypotenuse, the median to the hypotenuse and the hypotenuse bound a triangular region $R$. Express the ratio of the area of $R$ to the area of $ABC$ as the quotient of relatively prime integers.

C) Rowing upstream it took 4 hours to paddle 12 miles. Downstream, the same distance took an hour and a half. Under the same conditions, it would take $A$ minutes and $B$ seconds to paddle one mile downstream. If $B < 60$, compute $(A, B)$.

D) $\frac{n}{2}$ is subtracted from the numerator and denominator of $\frac{22}{7}$ producing a positive integer. Let $L$ and $S$ denote the largest and smallest positive integer values of $n$ for which this is possible. Determine the ordered pair $(L, S)$.

E) Solve for $x$ over the real numbers: $\sqrt{5x+9}+\sqrt{8x+17}=2$

F) The MML Contest Director lives in Fremont, NH, formerly called POPLIN. There are 359 different anagrams (rearrangements) of the letters in the word POPLIN. [$\frac{6!}{2!}-1=\frac{6\cdot5\cdot4\cdot3\cdot2\cdot1}{2\cdot1}-1=360-1=359$. Obviously, POPLIN is not an anagram of itself and, therefore 1 was subtracted from the total.]

How many anagrams are there where the Ps are not consecutive and the vowels are not consecutive?