



NEW ENGLAND MATHEMATICS LEAGUE

P.O. Box 6, Sharon, Massachusetts 02067-0006

All official participants must take this contest at the same time.

Contest Number 5

Any calculator without a QWERTY keyboard is allowed. Answers must be exact or have 4 (or more) significant digits, correctly rounded.

February 9, 2016

Name _____ Teacher _____ Grade Level _____ Score _____

Time Limit: 30 minutes

NEXT CONTEST: MAR. 15, 2016

Answer Column

5-1. If $-1 < x < 0$, then for what positive integer $n \leq 2016$ does x^n take on its least value?

5-1.

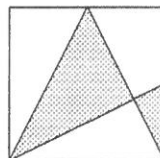
5-2. If we remove the first + sign and then “close” the resulting space in $1+2+3+4+5+6+7+8+9$, we’ll get $12+3+4+5+6+7+8+9 = 54$. What is the ordinal number (first, second, etc.) of the + sign whose removal, followed by a “closing” of the resulting space, would make the resulting sum equal 99?

5-2.

5-3. For how many different integers $b > 1$ is $\log_b 256$ a positive integer?

5-3.

5-4. In the diagram, three segments are drawn interior to a square. Each segment connects a vertex of the square to the midpoint of a side of the square. If the area of the larger shaded triangle is 150, what is the area of the smaller shaded triangle?



5-4.

5-5. Regular polygons M and N have m and n sides respectively, with $m > n$. What are all ordered pairs (m, n) for which the ratio of the measure of an interior angle of M to the measure of an interior angle of N is 3:2?

5-5.

5-6. From a box containing 20 gold, 10 silver, and some bronze medals, the probability of randomly selecting 2 gold and 2 silver medals, with replacement, equals the probability of randomly selecting 1 gold, 1 silver, and 2 bronze medals, with replacement. How many bronze medals are in the box?



5-6.

Eighteen books of past contests, *Grades 4, 5, & 6* (Vols. 1, 2, 3, 4, 5, 6), *Grades 7 & 8* (Vols. 1, 2, 3, 4, 5, 6), and *HS* (Vols. 1, 2, 3, 4, 5, 6), are available, for \$12.95 each volume (\$15.95 Canadian), from Math League Press, P.O. Box 17, Tenafly, NJ 07670-0017.