

TEXAS STATE MATHEMATICS LEAGUE

P.O. Box 11038, Spring, Texas 77391-9998

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

Contest Number 1

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

October 20, 2009

Name _____ Teacher _____ Grade Level _____ Score _____

Time Limit: 30 minutes

NEXT CONTEST: NOV. 17, 2009

Answer Column

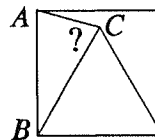
1-1. What value of x satisfies $x(x-2009) = x(x+2009)$?

1-1.

1-2. My 5 coupons are worth \$1, \$2, \$5, \$6, and \$10, respectively. What are the only two whole-number dollar amounts from \$1 through \$24 that I cannot pay exactly using one or more of these 5 coupons?

1-2.

1-3. An equilateral triangle and a square share a common side, as shown. In non-equilateral $\triangle ABC$, what is $m\angle ACB$?



1-3.

1-4. Write a triple of positive integers (a,b,c) for which $28a+30b+31c = 365$.

1-4.

1-5. In a certain two-person game, each player, in turn, removes 1, 2, 3, 4, or 5 toothpicks from a common pile, until the pile is exhausted. The player who takes the last toothpick loses. If the starting pile contains 300 toothpicks, how many toothpicks must the first player take on the first turn to guarantee a win with perfect subsequent play?

1-5.

1-6. Last year, each of Big Al's five brothers gave a gift of money to Big Al. The dollar amounts were consecutive integers, and their sum was a perfect cube. If the brothers decide to give Big Al cash gifts with those same properties both this year and next year as well, but this year's sum is larger than last year's, and next year's sum larger still, what is the least possible dollar amount Big Al could get next year from his five brothers combined?



1-6.

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