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 3

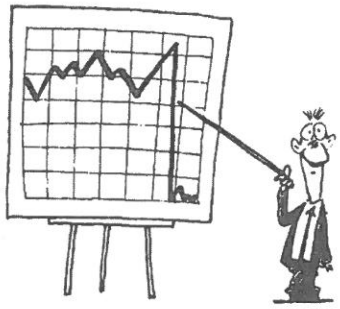
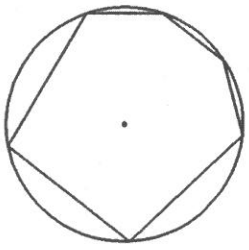
Any calculator without a QWERTY keyboard is allowed. Answers must be exact *or* have 4 (or more) significant digits, correctly rounded.

December 12, 2017

Name _____ **Teacher** _____ **Grade Level** ____ **Score** ____

Time Limit: 30 minutes

NEXT CONTEST: JAN. 9, 2018

		Answer Column
3-1.	What is the least possible value of a for which $a^2 + 40^2 = 50^2$?	3-1.
3-2.	There are an infinite number of points with positive coordinates (x,y) the sum of whose coordinates is the square of an integer. Among all such points (x,y), which one satisfies $y = 2x$ and has x as small as possible? 	3-2.
3-3.	If 8 different integers are chosen at random from the first 15 positive integers, what is the probability that an additional number chosen at random from the remaining 7 positive integers is smaller than every one of the 8 originally chosen positive integers?	3-3.
3-4.	If the perimeter of an isosceles triangle with integral sides is 2017, how many different lengths are possible for the legs?	3-4.
3-5.	If $0 < a \leq b \leq 1$, what is the maximum value of $ab^2 - a^2b$?	3-5.
3-6.	A hexagon is inscribed in a circle as shown. If lengths of three sides of the hexagon are each 1 and the lengths of the other three sides are each 2, what is the area of this hexagon? 	3-6.