Contest Number 6   *Any calculator without a QWERTY keyboard is allowed.* Answers must be exact *or* have 4 (or more) significant digits, correctly rounded.   **March 16, 2021**

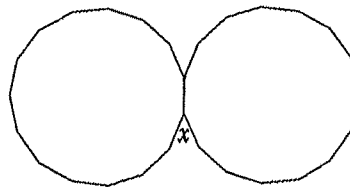Name _____ Teacher _____ Grade Level _____ Score _____

Time Limit: 30 minutes	FINAL CONTEST OF THE YEAR	*Answer Column*

6-1. If x is real, what is the greatest possible value of $\dfrac{4042}{2021x^{2020} + 2}$?

    6-1.

6-2. Two coplanar congruent regular 15-gons share a side in common, but have no interior points in common, as shown. What is the degree-measure of the angle marked x?

    6-2.

6-3. If $\log_{10}(1) + \log_{10}(2) + \log_{10}(3) + \ldots + \log_{10}(2000) = 5735.52\ldots$, then how many digits are there in the expansion of 2000!, where the exclamation point represents "factorial"?

    6-3.

6-4. If the roots of $x^3 + ax^2 + bx + c$ are 1, 2, and 3, what are the roots of

$$(x-2)^3 + a(x-2)^2 + b(x-2) + c = 0?$$

    6-4.

6-5. My three cars can travel the same distance on a tank of gas. My second car gets 6 kilometers per liter more than my first, but its tank holds 3 fewer liters than my first. My third car gets 6 kilometers per liter less than my first, but its tank holds 6 more liters than my first. How many kilometers can each car travel on a tank of gas?
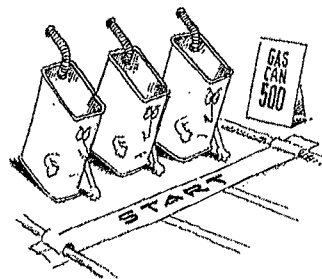
    6-5.

6-6. By drawing a line parallel to its bases, I can split trapezoid T into two new trapezoids whose areas are equal. If the bases of T have lengths 2 and 14, how long is the segment common to the new trapezoids?

    6-6.