Bergen County Mathematics League

Good Luck To You

Good Luck To All

Contest #1 (No Calculators) **2012-2013**

Part I *Time Limit: 12 minutes* On contests #2, #4, and #6, ***any S.A.T. calculator will be allowed.***

1-1. In a set of 4 consecutive positive integers whose sum $S > 20$, the product of the 2 largest integers in the set has, as its digits, the 2 smallest integers in the set. What is the least possible value of S?

1-2. When all 5 diagonals of regular pentagon P_1 are drawn, a smaller regular pentagon P_2 is formed. What is the ordered pair of integers (c,d) for which the ratio of the perimeter of P_2 to that of P_1 is $\frac{1}{2}(c - \sqrt{d})$?

Part II *Time Limit: 12 minutes*

1-3. Let $\sqrt{6+\sqrt{6+\sqrt{6+\sqrt{6+\ldots}}}} = n$, where dots represent an infinite continuation of the operations of addition and taking a square root, as shown. Write the value of n in simplest form.

1-4. What are all ordered pairs of real numbers (x,y) which satisfy both $x+y = 14$ and $x-y+\sqrt{x-y} = 6$?

Part III *Time Limit: 12 minutes*

1-5. Mrs. Ross is twice as old as Janet. Janet is twice as old as Peter. In x years, Mrs. Ross' age then will be twice Peter's age then. What is Mrs. Ross' current age (in terms of x)?

1-6. Medians $\overline{BM}$ and $\overline{CN}$ of $\triangle ABC$ are perpendicular to each other. If $BC = 10$, what is the length of median $\overline{AP}$?

***Notice*: A question next meet will repeat the diagram of question 1-2.**

Answers

1-1. 26

1-2. (3,5)

1-3. 3

1-4. (9,5)

1-5. $2x$

1-6. 15