Bergen County Mathematics League

Good Luck To You — Good Luck To All

Contest #2 (Calculators Allowed) — **2009-2010**

Part I *Time Limit: 12 minutes* Answers must be exact ***or*** have 4 (or more) significant digits, correctly rounded.

2-1. $\{F_n\}$ is defined by $F_1 = -1$, $F_2 = 1$, and, for $n > 2$, $F_n = F_{n-1}+F_{n-2}$. What is the value of F_{10}?

2-2. The Parallelogram Law says that the sum of the squares of the lengths of all sides of a parallelogram equals the sum of the squares of the lengths of its diagonals. In parallelogram P, both diagonals have integral lengths. If adjacent sides of P have lengths 4 and 7, what is the greatest possible length of one of P's diagonals?

Part II *Time Limit: 12 minutes* Answers must be exact ***or*** have 4 (or more) significant digits, correctly rounded.

2-3. What is the product of the greatest common divisor and the least common multiple of two positive integers x and y? (Give your answer in terms of x and y.)

2-4. What is the smallest positive integer greater than 5 which leaves a remainder of 5 when divided by each of 6, 7, 8, and 9?

Part III *Time Limit: 12 minutes* Answers must be exact ***or*** have 4 (or more) significant digits, correctly rounded.

2-5. What are all ordered pairs of positive numbers (x,y) for which $x = \sqrt{2y}$ and $y = \sqrt{x}$?

2-6. How many minutes past 4 o'clock are the hands of a standard 12-hour clock first perpendicular to each other?

***Notice*: A question on the next meet will repeat the theme of question 2-6.**

Answers

2-1. 13

2-2. 9

2-3. xy

2-4. 509

2-5. $(2^{2/3}, 2^{1/3})$ or $(\sqrt[3]{4}, \sqrt[3]{2})$ or exactly equivalent ORDERED PAIR

2-6. $5\frac{5}{11}$