Problem #133 (in the February 2007 issue) introduces the concept of Single Digit Quality, or SDQ.

Review: We can immediately find the single digit quality for every positive number by adding the digits in that number until a single digit is obtained. To indicate that we are reducing a number to its single digit quality we write it as: 137 => 11 => 2. Thus, the SDQ of 137 is 2.

In problem #171 (October 2008) the Fibonacci Series was first examined, a recursive sequence where each term or number is the sum of its two preceding numbers.

In the next series of problems we will examine new concepts of SDQ and Fibonacci.

The regular Fibonacci series is given by:

1, 1, 2, 3, 5, 8, 13, 21, 34, 55, 89, 144, 233, 377, 610, 987, 1,597, 2,584, 4,181, 6,765, 10,946, 17,711, 28,657, 46,368; 75,025, 121,393, 196,418…, where each new number is the sum of the two preceding numbers.

a) Write the first 17 terms of the square of each Fibonacci number.

b) What is the significance of, say, the 13th term divided by its preceding term? By its following term?

c) Now write the SDQ of each of these Fibonacci Square numbers. Is there a quicker method to finding the SDQ of the Square Fibonacci series?

d) Does this yield a repeating series as did the SDQ of the Regular Fibonacci numbers?

e) If so, what is this repeating series?

f) What stands out in the number of different digits in the SDQ Fibonacci Square series?