Tuesday Jan 6, hour 1: Search for a Pattern

January-04-15 10:38 AM

make, bring textbook.

Go over index, About, Larson's page 8?

1.1.1. Prove that a set of n (different) elements has exactly 2^n (different) subsets.

Too easy.

1.1.2. Let $S_{n,0}$, $S_{n,1}$, and $S_{n,2}$ denote the sum of every third element in the nth row of Pascal's Triangle, beginning on the left with the first element, the second element, and the third element respectively. Make a conjecture concerning the value of $S_{100,1}$.

done fine – but no discussion of $\sqrt[3]{1}$.

1.1.3. Let $x_1, x_2, x_3, \ldots$ be a sequence of nonzero real numbers satisfying

$$x_n = \frac{x_{n-2}x_{n-1}}{2x_{n-2} - x_{n-1}}, \qquad n = 3, 4, 5, \ldots .$$

Establish necessary and sufficient conditions on x_1 and x_2 for x_n to be an integer for infinitely many values of n.

1.1.4. Find positive numbers n and $a_1, a_2, \ldots, a_n$ such that $a_1 + \cdots + a_n = 1000$ and the product $a_1 a_2 \cdots a_n$ is as large as possible.

1.1.5. Let S be a set and $*$ be binary operation on S satisfying the two laws

$$x * x = x \qquad \text{for all } x \text{ in } S,$$

$$(x * y) * z = (y * z) * x \qquad \text{for all } x, y, z \text{ in } S.$$

Show that $x * y = y * x$ for all x, y in S.

$ab = (\underset{x}{a}\underset{y}{b})(\underset{z}{a}\underset{}{b}) = (\underset{x}{b}\underset{y}{(ab)})\underset{z}{a} = ((ab)a)b = ((\underset{x}{b}\underset{y}{a})\underset{z}{a})\underset{}{b} =$

$(ab)ab$ $\qquad (ab)(ab)$ $\qquad ((ba)b)b$

$(ab)b$

$(bb)a$

ba