CSE 321 Worksheet #5

Thursday, November 30, 2003

1. Give a recursive algorithm form computing nx whenever n is a positive integer and x is an integer.
2. Prove that the recursive algorithm that you found in (1) is correct.
3. Prove that
   procedure power (a: nonzero real number, n: nonnegative integer)
   if $n = 0$ then *power(a,n) := 1*
   else *power(a,n) := a * power(a,n - 1)*
   is correct.
4. Find an explicit fomula for f(n) if $f(1) = 1$and $f(n) = f(n-1) + 2n -$ 1for$n \geq 2$. Prove your result using mathematical induction.
5. Use mathematical induction to prove this fomula for the sum of the terms of an arithmetic progression.

$$a + (a + d) + \ldots (a + nd) = \frac{(n+1)(2a + nd)}{2}$$

6. Use mathematical inducation to show that when n circles divide the plane into regions, these regions can be colored with different colors such that no regions with a common boundary are colored the same.