

Mathematics 149S
Fall 1997
Problem Set 13

1. The mayor of Wohascum Center has ten pairs of dress socks, ranging through ten shades of color from medium gray (1) to black (10). A pair of socks is unacceptable for wearing if the colors of the two socks differ by more than one shade. What is the probability that if the socks get paired at random, they will be paired in a way so that all ten pairs are acceptable?

2. Let k be a positive integer. What is the largest power of 3 that divides $10^k - 1$?

3. Find all integer solutions to

$$x^2 + 615 = 2^n.$$