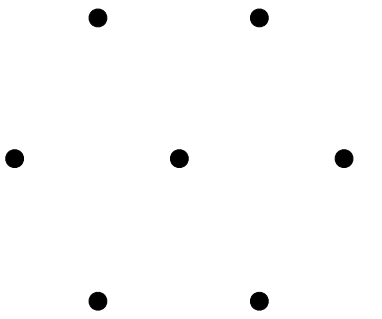
Name: _____

Math 378 Spring 2011
Bonus Questions 4

1. How many integers can be expressed as a sum of two or more different members of the set $\{0, 1, 2, 4, 8, 16, 31\}$?

2. Fix a regular hexagon in a plane. Let $\mathcal{S}$ denote its vertices along with its center. How many equilateral triangles have at least two vertices in $\mathcal{S}$? (Reference the image below for clarification.)



3. How many numbers between 1 and 100 (inclusive) can be written as the sum of 3 or fewer values from $\{1, 3, 9, 27, 81\}$ if repeated choices are allowed? For example, 5 is good because $3 + 1 + 1 = 5$ but 8 is bad since it must be $3 + 3 + 1 + 1$ (requiring 4 values from the set).