

# PROBLEMS FOR SEPTEMBER'09 DUE OCTOBER 15

## 1. Squares in the Plane

In the Cartesian plane, consider the set of points

$$A = \{(i, j) | 0 \leq i, j \leq 40, \text{ with } i \text{ and } j \text{ integers}\}$$

How many squares can be formed so that all corners of all squares belong to  $A$ , with sides parallel to the  $x$  and  $y$  axes?

## 2. A Cubic Polynomial

For  $f(x) = x^3 + 6x^2 - 15x + k$ , the absolute maximum and absolute minimum values on the interval  $[-10, 2]$  have the same absolute value. Find the value of  $k$ .

Copies available below! Feel free to take one! You can also find a copy at the Math Club website at  
<http://faculty.randolphcollege.edu/ykurt/mathclub/mathclub.htm>.