

**Math 30 Introduction to Problem Solving**  
**Some problems for 2/4**

1. For  $n \in \mathbb{N}$  which numbers are expressible as

$$[n + \sqrt{n} + 1]?$$

2. Given a deck of 8 cards. Choose 4 cards at random and put them on the top of the deck in the order in which they originally occurred. What is the average number of cards that are in their original place? For example, if the cards are 1,2,5,7 then the new order is 1,2,5,7,3,4,6,8 and 1,2,8 are in their original place. How about 10 cards and five are chosen? How about choosing  $n$  cards from a deck with  $2n$  cards?
3. Determine all prime  $p$  such that  $p^2 + 2$  is also prime.