

REVIEW #2

Problem 1. You are a soccer coach with a huge supply of gold, silver and bronze medals in your minivan. There are 12 children on your team, and the parents insist that every child wins a medals.

- (a) You tell your assitant to go the the minivan and select any assortment of medals, as long as there are 12 total. How many ways can he or she do this?
- (b) If he or she happens to select 10 gold, 1 silver and 1 bronze, how many ways can you award these?
- (c) If you or she happens to select 10 gold, 2 silver and 0 bronze, how many ways can you award these?

Problem 2. Find the general solution to the recurrence relation

$$a_n = 4a_{n-1} - 5a_{n-2} + 2a_{n-3}.$$

Problem 3. Suppose

$$a_1 = 1,$$

$$a_2 = 2$$

and, for $n \geq 2$,

$$a_n = 2a_{n-1} + a_{n-2}.$$

For which n is a_n even? Prove your answer.

Problem 4. Solve for x and y :

$$x + y \equiv 1401 \pmod{2801}$$

$$2x - y \equiv 0 \pmod{2801}$$

Problem 5. Prove that

$$F_n \leq n!$$

for all $n \geq 1$, were F_n is the n th Fibonacci.