

**Spring 2017 COT 3100 Section 2 Quiz #2**

**Last Name:** \_\_\_\_\_, **First Name:** \_\_\_\_\_

**Lab Section: 17-T4:30 18-T4:30 19-R4:30 20-R4:30 21-T9:00 22-R9:00 24-F1:30**

1) (12 pts) Let  $t_n$  be a sequence defined as follows:

$$t_0 = 5, t_1 = 7 \text{ and } t_n = 3t_{n-1} - 2t_{n-2}, \text{ for all integers } n > 1.$$

Using strong induction on  $n$ , prove that for all non-negative integers  $n$ ,  $t_n = 2^{n+1} + 3$ . (Note: You will need to use two base cases in your proof.)

3) (13 pts) Prove for all non-negative integers  $n$  that  $\begin{bmatrix} 2 & 1 \\ 0 & 1 \end{bmatrix}^n = \begin{bmatrix} 2^n & 2^n - 1 \\ 0 & 1 \end{bmatrix}$ .