1. Problem PS 3.1 $\rightarrow$ Use induction to prove the following claims

   (a) $P(n) = L_0 + L_1 + L_2 + ... + L_n = L_{n+2} - 1$

   - BASE CASE: $L_0 = L_2 - 1$
   - $L_0 = 2$, $L_2 = 3$, $2 = 3 - 1 \rightarrow 2 = 2$, base case is true
   - INDUCTION: If $L_0 + L_1 + ... + L_n + L_{n+1} = L_{n+1+2} - 1$
   - LHS: $L_{n+2} - 1 + L_{n+1}$?

   (b) $L_n = F_{n-1} + F_{n+1}$

   - BASE CASE: $L_1 = F_0 + F_2$
   - $L_1 = 1$, $F_0 = 0$, $F_2 = 1$
   - $1 = 1$, base case is true
   - INDUCTION: $L_{n+1} = F_n + F_{n+2}$

2. Problem 3.2 $\rightarrow$ Use induction to prove

   (a) $2 + 6 + 12 + ... + (n^2 - n) = \frac{n(n^2)-1}{3}$

   - BASE CASE: for n = 0: $0^2 - 0 = \frac{0(0^2-1)}{3} = 0$, base case is true
   - INDUCTION: $2+6+12+...+(n^2-n)+((n+1)^2-(n+1)) = \frac{(n+1)(n+1)^2-1}{3}$
   - work with LHS: $\frac{n(n^2)-1}{3} + ((n+1)^2 - (n+1)) = \frac{(n+1)(n+1)^2-1}{3}$
   - $\frac{n(n^2)-1}{3} + (n^2 + n) = \frac{(n+1)(n^2+2n+1)-1}{3}$
   - $\frac{n^3-1}{3} + n^2 + n = \frac{n^3+2n^2+n+n^2+2n+1-1}{3}$
   - $\frac{n^3-1+3n^2+3n}{3} = \frac{n^3+2n^2+n+n^2+2n}{3}$
   - leaves us with $\frac{n^3+3n^2+3n-1}{3} = \frac{n^3+3n^2+3n}{3}$
   - However, these aren't equal...