MATH 2001
Practicing Proof by Induction

1. Prove that for all $n \geq 0$, $3|(n^3 + 3n^2 + 2n)$

   Setup:

   - What is $P(n)$?: _____
   - What is $P(k)$?: _____
   - What is $P(k+1)$?: _____
   - What is the base case that you need to prove?_____
   - What is the inductive hypothesis for this proof?_____

   Proof:
   Step 1:

   Step 2:

   Step 3:

2. Prove that $n! > 2^n$ for natural numbers $n \geq 4$.