DO NOT turn in

$$\overline{}$$
Name

Be sure to re-read the WRITING GUIDELINES rubric, since it defines how your project will be graded. In particular, you may discuss this project with others but **you may not collaborate on the written exposition of the solution.**

"The golden rule of life is, make a beginning." - American proverb

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One of the following will be on the examination.

There are many ways to prove the following theorems but you **must** use mathematical induction for this project.

1. Let A be a square matrix of size $n \geq 2$ and B the matrix obtained after switching two rows of A (a type 1 elementary row operation). Use the technique of mathematical induction to prove that $\det(A) = -\det(B)$.

2. Let A be a square matrix of size $n \geq 2$ and B the matrix obtained after multiplying each entry of row i of A by the nonzero constant α (a type 2 elementary row operation). Use the technique of mathematical induction to prove that $\det(A) = \frac{1}{\alpha} \det(B)$.

3. Let A be a square matrix of size $n \geq 2$ and B the matrix obtained by adding α times row j to row i (a type 3 elementary row operation). Use the technique of mathematical induction to prove that $\det(A) = \det(B)$.

4. Let A be a square matrix of size $n \geq 2$ in which two rows are exactly the same. Use the technique of mathematical induction to prove that $\det(A) = 0$.