Patterns in Exponents

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Every single branch of science has its origins in math. Of all the mathematical concepts, exponents constitute one of the most fundamental and useful tools. This purpose of this project is to identify repetitive patterns in the difference of sequential integers raised to the power "n" which may be analyzed and then implemented to facilitate calculations of larger exponents. It was proposed that a pattern would occur between the differences, and that the pattern rule would be n!. No information was found in the research phase which was relevant to the predicted relations. To explore this, a set of tables with the sequences of integers raised to different exponential powers were rendered. From each number, the value of the preceding number was subtracted; thus creating a new list. This subtraction procedure was repeated until the procedure yielded a repeating number. The resulting reappearing numbers were then analyzed for a pattern. The results showed that the repeating number appeared for an exponent 'n' after 'n' procedures and that the number was 'n!'. Using these results a formula has been derived which describes the pattern as well as an individual formula for each separate exponential power.

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