

# Approximating Sinusoidal Functions with Interpolating Polynomials

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## Abstract:

We discuss the idea of approximating the sine and the cosine functions using interpolating polynomials at the precalculus level as an alternative to the Taylor polynomial approach in calculus. The approach can serve as a capstone experience in precalculus that links together a number of major themes, including the behavior of polynomials, the exponential and logarithmic functions, and the notion of curve fitting. Emphasis is on achieving any desired level of accuracy, strategies to improve the accuracy, and the behavior of the error function (the difference between the function and its approximation). The development is enhanced by the use of several dynamic interactive spreadsheets for experimenting with the concepts; these will be made available to readers for their own and their students' use from the journal's website.



**Sheldon P. Gordon** is a SUNY distinguished teaching professor of mathematics at Farmingdale State College. He has served on a variety of MAA national committees involved in mathematics education. Shelly has written over 200 articles and is coauthor of *Functions, Data, and Models: An Applied Approach to College Algebra, Functioning in the Real World*, and *Contemporary Statistics: A Computer Approach*. He was coeditor of the MAA volumes *Statistics for the Twenty-First Century* and *A Fresh Start for Collegiate Mathematics: Rethinking the Courses Below Calculus*.



**Yajun Yang** is a professor of mathematics at Farmingdale State College. She received a PhD in mathematics from the University of Iowa. Her research interests include numerical analysis, statistical analysis, and applications of mathematics. She is also interested in making precalculus and calculus more meaningful to students and in incorporating technology into the classroom.