LOGARITHMS

Mathematical functions using logarithms simplify computations with rates and areas that result from situations in physic, biology, medicine, and finance. In addition, Logarithmic scales are used in newspapers, households, and automobiles as well as in scientific research. How loud is a rock concert? Noise is measured in decibels, a logarithmic scale that is easier to use than the sound-energy measurement of watts per square meter.
Logarithms appear in a wide range of industrial and technological applications. For example, Economists use logarithmic derivatives to compare prices changes of different items.

MATRICES

Matrices remains a critical issue for mathematics and computer analyst, because scientist in fields as widely diverse as astronomy, weather forecasting, statics, economics, archeology, water management, weapons races between countries, chicken production, airline travel routes, investment banking, marketing studies, and medical research rely on the efficient reduction of large matrices of information. For example, Airlines use matrices on a daily basis to determine the most profitable way to assign planes to flights between different cities.

POLAR COORDINATES

Polar coordinates can be used to map the earth. Navigators on ships and airplanes use the language of polar coordinates to specify the direction and speed of travel. Astronomers use polar coordinates to plot paths of planets and the sun with respect to a viewing position on the earth.

POLYNOMIAL FUNCTIONS

Polynomial functions with degree three or greater are found in applications associated with volume and financial planning. Long-term investing uses a polynomial function to account for money that is invested each year. Polynomial functions provide useful information for people in their financial planning so that they can learn how to save money for their children's education and their own retirement.

PROPORTIONS

Cartographers use proportions to make maps, because they need to scaledown distances so that large pieces of land can be viewed on a sheet of paper. For example, the state of Illinois is approximately 370 miles long. If the map maker needs to use proportions to place Illinois on a sheet of paper that is 25 cm long. Another application of proportions in the real life is in movies screens, because in order to project

a film perfectly on the screen, a proportion comparing the height and width needs to be used so that the correct height of the screen can be accurately determined.

The population of wildlife animals is determined by tagging animal and using proportions, because counting every animal in a region would be too difficult to find all of them. It is important to know these populations in order to understand if a species is at risk of endangerment, or if there is an overpopulation that is affecting an ecosystem.

QUADRATIC FUNCTIONS

Applications of quadratic functions commonly refer to maximizing or minimizing a quantity. For example, a business owner would be interested in the greatest profit his or her company can attain based on the sales of its products. On the other hand, engineers of fireworks can use this type of function so that the rockets explode at a time where optimal height offers safety as well as viewing pleasure.

SEQUENCES

Sequences exist in applications that have discrete and predictable patterns, such as the value of an automobile, camera aperture, music notes, or predicting the timing of an eruption. In the case of automobile value, it is based using sequences as its original price, depreciation rate, and age.

SERIES

Many applications that are based on the sum of predictable discrete patterns can be examined with *series*. For example, a doctor may prescribe an amount of medication to take each day, because he or she knows that the patient's bloodstream will be able to maintain a certain level of the medication over time. Prescriptions are based on a mathematical series, because the total amount of drug accumulates in the bloodstream each day.