Course work on algebraic exponents and polynomials used in real-world application...

Health & Medicine, Alcoholism

Algebraic time series equations which consider a constant base and a variable exponent are used every day by banks, financial institutions, scientists, engineers and in the health and wellness profession. The users may not even know that they are computing exponential functions of algebra. Health care givers, nurses and doctors must be familiar with the formula to be able to administer the correct dosage of medication. For example, if a person is brought to the emergency room with a high blood alcohol level the dosage of medication will have to be determined based on the alcohol concentration in the blood.

Dr. E. M. P. Widmark researched blood alcohol concentration and the variables that must be considered. Now the Widmark equation1 is the basis for blood alcohol measurements.

$$\mathbf{AC = BW*r(BAC*t + \beta*t)/P}$$

where: AC = Alcohol Consumed = the number of drinks consumed

BW = Body Weight = body weight in ounces

r = volume of distribution (a constant relating the distribution of water in the body in L/Kg)

BACt = Blood Alcohol Concentration = the blood alcohol concentration Kg/L

β = the alcohol elimination rate in Kg/L/hr (amount lost in the urine)

t = time = time duration since the first drink in hours

P= the alcohol Proof = the density of ethanol (0. 8 oz. per fluid ounce)

Blood sugar concentrations graphed vs. hourly measurements can be graphed with the amount of serum insulin for use by diabetics and their

health care givers. These calculations are rarely done by hand because of the availability of monitors for diabetics and their health care givers.

Medical uses are more difficult for the layperson to understand because they have not studied the subject in terms of dosage, elimination rates and other medical uses. It is easier to understand this concept in business because we expect the amount of money to increase when we are receiving interest over time. Being able to use the exponential function for predicting environmental problems is very helpful but the concept isn’t easy for most people to understand when explained in terms of environmental computer models.

References

1. Washington State DUI Attorney, (n. d.), Retrieved from http://www. seattle-duiattorney. com/dui/widmark-equation. php

2. Blood Sugar. 13 Aug. 2011. In Wikipedia online. Retrieved from http://en. wikipedia. org/wiki/Blood_sugar#Measurement_techniques