1046-Z1-167 **William M. Wagner*** (wwagner1@columbus.rr.com), c/o Kathryn L. Wagner, 7199 Dublin Rd., Dublin, OH 43017-1164. *Continual Compounding of a Conventional Mortgage.*

Definitions:

L: Mortgage Loan; e.g. $100,000.

T: Term in periodic units of time; e.g. 15 years.

R%: Rate of periodic interest; e.g. 6% per annum.

A: Amount of payment due at the end of one unit of time.

P: Instantaneous Principal.

The recursion relation for discrete compounding is $P(i+1) = P(i)[1 + R\%/m]$ where m is the number of payments (intervals) per unit of time; compounding occurs at the end of each such interval. As the cycle, $(1/m)$,of compounding and payments approaches infinity, the resulting limit is the first order linear Ordinary Differential Equation: $-dP/dt = -R\%P + A$ The Integration Factor for this O.D.E. is $EXP(-R\%t)$. It shall be shown that:

I. The amplication factor of the Loan for total payments is $(AT/L) = R\%T/[1 - EXP(-R\%T)]$; (Here, the total payment is $151,660.60-.)

II. Integral $[0, T; (-R\%P + A)] = L$; (This is analogous to the fact that, under discrete existense, the sum of the reductions in principal is equal to the Loan.)

III. The total interest $(AT - L) = R\%Integral[0, T; P]$. (Received August 10, 2008)