Calculating the Mortgage Constant

Loan to Value Ratio: 75%
Mortgage Rate: 7.5%
Term of Loan: 20 years-paid monthly
Required Equity Yield Rate: 10%
Cash Equity Percentage: 25% (100% - 75% LTV)

Mortgage constant is: "the level periodic installment that will pay interest and provide full amortization or recapture of an investment of one in a given number of periods with interest at the given rate per period"

HP 12C steps to calculate Annual Mortgage Constant

f REG Clear payment registers

8 Set payment to end of period

1PV Present Value of 1

7.5i 7.5% Annual Rate divided by 12

20n 20 year term converted into 240 months

PMT Monthly payment or monthly mortgage constant

12x Convert result to Annual Mortgage Constant

Algebraic formula for Annual Mortgage Constant

Annual Mtg. Constant = 12 * i / (1 - (1 / (1 + i) ^ n))
where: i = annual mortgage interest rate divided by 12
n = term of loan in months

The Annual Mortgage Constant for a loan with a 7.5% interest rate and a 20 year term is .0967. Multiplying this Constant time the size of the loan gives the annual mortgage payment. Note that in approaching the calculation in this manner, we are not considering the size of the loan.

If the loan size was 100,000 the annual Mortgage Constant payment is 100,000 time .0967. If the loan size is 250,000 the Mortgage Constant Payment is 250,000 times .0967. The Mortgage Constant is the same no matter the size of the loan; the Mortgage Constant Payment does change with the loan size, of course.

If the loan was interest only, then the Mortgage Constant approach is not valid, as the Mortgage Constant calculates amortization of the loan. A 100,000 loan with a 7.5% interest rate would be serviced with an annual payment of $7,500 in interest annually. With amortization it is $9,670 annually.

Note that in both the HP 12C steps and the Algebraic formula, the monthly payment must be multiplied by 12 in order to arrive at the Annual Mortgage Constant.