

The Loan Affordability Calculator

There are often times where we make our purchase decisions based on our ability to make the payments. This is often the case with cars, house, furniture, appliances, and even services such as home improvements! Assume that you can afford to pay \$X a month for a mortgage and the bank has approved you for a 30 year, Y% interest rate loan. How much of a loan can you afford? If you find a very nice house that costs \$200,000, does your monthly payment and interest rate allow for it? Below we show the technical details of the calculations involved. The general reader can use our "Loan Affordability" calculator, to easily find out the maximum loan amount feasible.

Technical Appendix

In this appendix we demonstrate the financial calculations that enable you to find the present value of a special financing option.

Notation:

L – Loan amount

PMT – Amount you can afford to pay at each payment

N – Number of payments

r – Standard fixed interest rate

In general, the payment loan amount qualified can be characterized by (PMT, N, r) and is calculated by solving:

$$L = \sum_{t=1}^N \frac{PMT}{(1+r)^t} = PMT \sum_{t=1}^N \left(\frac{1}{1+r} \right)^t$$

This assumes that the first payment is due one month from signing, which is the typical case.

Let $R = \sum_{t=1}^N \left(\frac{1}{1+r} \right)^t = \frac{1}{1+r} - \left(\frac{1}{1+r} \right)^{N+1} \bigg/ 1 - \left(\frac{1}{1+r} \right)$, where R is the Present Value factor. In the special case of

$r = 0$, we set $R = N$, to avoid division by zero. Thus, $L = PMT \cdot R$, is the maximum feasible loan you can afford under the parameters (PMT, N, r) .

As long as the loan is under L , it is feasible and you can afford it!