

### Question #43239, Math, Algebra

You find that the going rate for a home mortgage with a term of 30 years is 4.5% APR. The lending agency says that based on your income, your monthly payment can be at most \$750 . How much can you borrow?

**Answer.**

In the case of a loan with no fees, the amortization schedule would be :

$$p = P_0 \frac{r(1+r)^n}{(1+r)^n - 1}$$

where:

$P_0$  is the initial principal

$r$  is the percentage rate used each payment

$n$  is the number of payments.

In our case:  $n = 30 * 12 = 360$ ,

$$(1+r)^{12} = 1.045 \rightarrow r = 0.003675,$$

$$p = \$750.$$

So,

$$P_0 = p \frac{(1+r)^n - 1}{r(1+r)^n} = 750 \frac{(1+0.003675)^{360} - 1}{0.003675(1+0.003675)^{360}} = 149595.83.$$

So you can borrow \$150,000.