

# Why Money Factor is multiplied by 2400 to get the annualized monthly interest rate?

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## 1 Maths behind

Why Money Factor is multiplied by 2400 to get the annualized monthly interest rate?

$$MoneyFactor = [by\_definition] = \frac{\sum_j P_j}{(CC + RV) * N_{months}}$$

where:

- $P_j$  - payment number  $j$
- CC - Capitalized cost: Often shortened to cap cost, this is the initial price of the car. You can negotiate the cap cost just as you would when buying a car.
- Residual value: The value of the car at the end of the lease, which may be determined by a third party.
- N - number of month/years

Let's try to multiply it with 2400 = 2 \* 12 \* 100 using the property  $\frac{a}{b} * c = \frac{a}{\frac{b}{c}}$

$$\begin{aligned} MoneyFactor &= \frac{\sum_j P_j}{(CC + RV) * N_{months}} * 2 * 12 * 100 = \frac{\sum_j P_j}{\frac{CC+RV}{2} * \frac{N_{months}}{12}} * 100 = \\ &= \frac{\sum_j P_j}{AverageLoanAmount * N_{years}} * 100 = \frac{\sum_j P_j}{AverageLoanAmount} * 100 * \frac{1}{N_{years}} = \\ &= PerCentAllTimeInterest * \frac{1}{N_{years}} = PerCentOneYearInterest \end{aligned}$$

Explanations:

- The car has money value, hence considered as a loan.
- However, the car's value is depreciating with time (assumed linearly).

- Your loan amount, hence, is not constant, it is dropping over time.
- Since linearity is assumed, the reduction speed is constant, meaning that the loan base is an average.
- Example  $100 * i + 80 * i + 60 * i + 40 * i = \frac{100+80+60+40}{4} * i = 70i = \frac{100+40}{2} * i$