

Mortgage calculator – How UK mortgage lenders calculate your mortgage payments

How interest is charged

Mortgage lenders use a number of different methods for charging interest, these methods fall into one of three categories: -

Daily interest charging.

Monthly interest charging.

Annual interest charging.

Annual interest charging

The most simplest of these is the annual interest charging method, this is certainly the oldest method adopted by lenders. Interest is charged at the start of the year based on the mortgage balance figure. This interest amount is then divided through the 12 months of the year for each payment for an interest-only mortgage or combined with capital for each payment if a full repayment mortgage.

Interest-only calculation

Monthly payment = (balance x rate)/12

So with a balance of £100,000 and a rate of 6.5%: -

Monthly payment = (100,000 x 0.065)/12

Monthly payment = £541.67

Full repayment calculation

Monthly payment = $[\text{rate} \times (\text{balance} \times (1+\text{rate})^{\text{term}})] / (1-(1+\text{rate})^{\text{term}})] / 12$

so with a balance of £100,000 and a rate of 6.5%: -

Monthly payment = $[(0.065 \times (100000 \times (1+0.065)^{25})) / (1-(1+0.065)^{25})] / 12$

Monthly payment = £683.18

Monthly interest charging

With monthly interest charging, the annual interest rate is first divided by 12 to establish a monthly interest rate. This new monthly interest rate is then applied to the mortgage balance to calculate a monthly interest charge for each payment on an interest-only mortgage or combined with capital for each payment if a full repayment mortgage.

Interest-only calculation

Monthly payments = balance x (rate/12)

So with a balance of £100,000 and a rate of 6.5%: -

Monthly payments = 100000 x (0.065/12)

Monthly payments = £541.67

Full repayment calculation

Monthly pay rate (mrate) = rate/12

Monthly payment = $[\text{mrate} \times (\text{balance} \times (1 + \text{mrate})^{(\text{term} \times 12)})] / [1-(1+\text{mrate})^{(\text{term} \times 12)}]$

so with a balance of £100,000 and a rate of 6.5%: -

mrate = 0.065/12

$$\text{Monthly payment} = [0.0054 \times (100000 \times (1 + 0.0054)^{300})] / [1 - (1 + 0.0054)^{-300}]$$

$$\text{Monthly payment} = \text{£}675.21$$

As you can see there are benefits to having a monthly interest charged mortgage over an annually charged one if your mortgage is a full repayment mortgage as this example shows a saving of £8 per month.

Daily interest charging

Many mortgage lenders in the UK have now adopted daily interest charging methods, this method is far more complicated and many lenders have their own rules on how they calculate daily charges of interest. Therefore for the purpose of this article the following method will be used, this should provide a guide to how much savings can be made with a daily interest charging method. In order to calculate the daily rate of interest we start with the annual interest rate and divide this through by 365.25 days (0.25 being the leap year). We must then multiply this by the days in any particular month. However you do not make mortgage payments every single day so these charges are rolled up and charged to you on a monthly basis. The main benefit with daily interest charging comes when you make over-payments reducing your mortgage balance immediately benefiting from lower interest being charged. Daily interest charging is often used with flexible mortgages, offset mortgages and current account mortgages as these present huge benefits to the borrower.

Dealing with rate changes

Most of today's mortgages start off with a special offer rate for a period of time then the mortgage often reverts to the lenders standard variable rate. For example a 4.5% fixed for 2 years followed by the lenders standard variable rate currently 5.6%. How do you calculate what payments will be in 2 years time once the special rate period has expired? Simply put you just start over using the new balance, and remaining term. So based on an original loan amount of £100,000 and mortgage term of 25 years

Interest-only mortgage

$$\text{First mortgage payment} = 100000 \times (0.045/12)$$

$$\text{First mortgage payment} = \text{£}375.00$$

then mortgage payments after the first 2 years will increase to: -

$$\text{First mortgage payment} = 100000 \times (0.045/12)$$

$$\text{First mortgage payment} = \text{£}375.00$$

Full repayment mortgage

$$\text{mrate} = 0.045/12$$

$$\text{First mortgage payment} = [0.00375 \times (100000 \times (1 + 0.00375)^{300})] / [1 - (1 + 0.00375)^{-300}]$$

$$\text{First mortgage payment} = \text{£}555.83$$

In order to calculate the new mortgage payments after the first 2 years we must first calculate the new balance as capital will have been paid for 24 months: -

$$\text{Future balance} = \text{Monthly payment} \times [(1 - (1 + \text{mrate})^{-(\text{term} \times 12)}) / \text{mrate}] - (\text{Initial balance} \times (1 + \text{mrate})^{-(\text{term} \times 12)})$$

$$\text{Future balance} = 555.83 \times [(1 - (1 + 0.00375)^{-300}) / 0.00375] - (100000 \times (1 + 0.00375)^{-300})$$

$$\text{Future balance} = \text{£}95467.67$$

Now we have a balance for 2 years in the future we can start over with a new balance and a 23 year term: -

$$\text{Next mortgage payment} = [0.00467 \times (95467.67 \times (1 + 0.00467)^{276})] / [1 - (1 + 0.00467)^{-276}]$$

$$\text{Next mortgage payment} = \text{£}615.91$$

Lenders will use a similar process to this when a variable rate changes during the term of the mortgage. They will first inform you of the rate change and then calculate the balance and start over with the remaining term, balance and new rate.

About the Author

Steve Wentworth formed his firm [Wentworth Financial Services Ltd](#) in November 2007 and has been in the Mortgage Industry since November 2002.

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