

# Troubleshooting APR and Fault Tolerance

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The [APRWin software](#) is a tool used to compare varying results which can occur when calculating APR. The wide array of variables makes this calculation susceptible to different outcomes. Below are some of the reason's, Creative Thinking's way of calculating APR, may cause a different result from the APRWin outcome.

**1 - A short loan term consisting of less than a year of monthly payments:** A problem is more likely to appear if the loan is amortized in actual days. And the loan is more likely to produce a large discrepancy when there are significant financed fees involved. APRWIN takes full advantage of regulations that permit loans which are being amortized in actual days, to instead be treated as if the length of months don't vary in length throughout the year. Creative Thinking's calculations take the actual days in each month into account. This variable can remain within tolerance on a longer term loan however, when the overall loan is less than a year in length (and depending on which months that year are included in the payment stream) the difference can become large enough to trigger concerns over tolerance. According to the OCC, the purpose of APRWin is to review accuracy for closed end loans which tend to have medium to long term repayment methods. For more details refer the following page, **APRWin Purpose According to OCC.**

**2 - When the first period is of extended length, consisting of more days than a normal payment period by the inclusion of ODD DAYS:** Instead of using a simple interest discounting over the entire first period, APRWIN has been found to do a COMBINATION of two simple interest period discounts. One for the ODD DAYS by itself, and one for the even period by itself. When this model is used in loans with unusually short terms, and especially if financed charges are involved, the resulting APR tends to be significantly underestimated.

It should be noted that the method of discounting a first extended period (with odd days) is being done in APRWIN just as it should be for **actuarial method**, so far as we understand it from our reading of Reg Z. And Most of the real estate loans Creative Thinking is called upon to compute APR for are using actuarial method, for the simple reason that they cannot be sold on the secondary market (Freddie Mac, Fannie Mae) otherwise.

However, on loans when the **US Rule** applies, the extended first period is treated as a single, simple interest discounting period based on a daily rate, and each whole period thereafter is also treated as a simple interest discounting period, but with the discount based on the actual number of days in each period, which varies slightly throughout a calendar year. Such calculations are a little more involved, but basically the same overall technique for determining APR is at work.

Creative Thinking's response from the OCC, indicates that the APRWin software will not take the US Rule method into account. The response Creative Thinking received from OCC was; "Although the OCC is considering updating APRWin, any updates are likely to conform to Regulation Z, and its Appendices J and M."

# APRWin Purpose according to OCC

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The APRWin program is most often used to review the accuracy of the disclosed APR and Amount Financed for closed-end loans secured with real property, which tend to have medium- to long-term repayment periods. The program does allow a user to select Actual Days for single advance / single payment loans, or to use the construction loan module for actual days. The program is intended to comport with the accuracy requirements of the Truth in Lending Act, implemented through Regulation Z (12 CFR 1026, formerly 12 CFR 226). Calculations are based on the actuarial method and calculation formulas contained in Appendix J and in Appendix D to the regulation.

The Appendices to Regulation Z are available at this link in PDF (please also review the sections in Supplement I to Part 1026-Official Interpretations that pertain to Appendix J:

[http://www.ecfr.gov/cgi-bin/text-idx?tpl=/ecfrbrowse/Title12/12cfr1026\\_main\\_02.tpl](http://www.ecfr.gov/cgi-bin/text-idx?tpl=/ecfrbrowse/Title12/12cfr1026_main_02.tpl)

[Appendix J to Part 1026](#)—Annual Percentage Rate Computations for Closed-End Credit Transactions

[Supplement I to Part 1026](#)—Official Interpretations

Or at the CFPB's eRegulations link which places relevant Staff Interpretations following the regulatory text:

[https://www.consumerfinance.gov/eregulations/1026-J/2016-14782\\_20160627#1026-J](https://www.consumerfinance.gov/eregulations/1026-J/2016-14782_20160627#1026-J)

The program is designed to determine:

- Whether a loan is regular or irregular.
- When a disclosed APR is understated or overstated.
- When a disclosed finance charge is understated or overstated.
- The appropriate reimbursement tolerance, including allowances for the 10% "obvious error" rule.
- Federal Reserve (Fed) Calendar measurements (including February 29).

The program is designed to verify the accuracy of regular and irregular transactions for the following:

- Annual Percentage Rate
- Finance Charge

The program will also determine the following:

- Total of Payments
- Finance Charge Reimbursement
- APR Reimbursement:
  - Lump Sum Method
  - Lump Sum/Payment Reduction Method
  - Adjustment as of the Final Payment Date

# APRWin according to OCC continued

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APRWin contains numerous Help Screens. For example, here are selections regarding actual days, and using the Construction Loan modules with actual days (up to 365 days in one year).

## **Actual Days**

This option applies to [Single Advance/Single Payment Loans](#) with terms that are measured in **actual** calendar days in a 365-day year (e.g., 92 days, 184 days, 293 days, etc.). After selecting this option, you will need to enter the [Days in Unit Period](#).

Instead of entering the number of days in the unit period, you may click on the [Calendar](#) button and enter the [Loan Date](#) and [Payment Date](#). The program will then compute the days in the unit period for you.

## **Installment Loans - Actual Days**

This option includes all loans with payments periods that are measured in equal daily periods (e.g., payments due every seven days, every 15 days, etc.), although the first period may be irregular.

## **Actual Days (365/365)**

### **Interest Accrual - Construction Loans**

This option applies to interest accruals that use an annual simple interest rate that is applied on a daily basis using a 365-day year. The daily rate equals the annual rate divided by 365. The multiple advance period may be for any term. Lenders accruing interest on this basis may still use *Whole Months (360/360)* if the term of the multiple advance period is equal months.

Either click on the calendar button (and then enter the Loan Date and Payment Date) or enter the following information:

**# of Days:** Enter the number of **actual** days in the construction period, not to exceed 365. February 29 may be ignored. For example, if the length of the construction period is one year and 10 days, enter 365 for the number of days. If the length of the construction period is 190 days, enter 190.

**# of Unit Periods:** Enter the number of unit periods in the construction period. A unit period must not be greater than 365 days. If the construction period is less than two years, the unit period is one. If the construction period is less than three years but more than two years, the number of unit periods is two.

**# of Odd days:** Enter the number of odd days in the construction period. For the construction loan program, the odd days are the number of days in excess of any full unit periods. For example, if the length of the construction period is one year and 10 days, enter one for the number of unit periods and 10 for the number of odd days. If the length of the construction period is 190 days, enter one for the number of unit periods and zero for the number of odd days. See also [Interest Accrual - Construction Loans](#).

# APRWin according to OCC continued

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## Odd Days

Generally, odd days are the number of **actual** days remaining after counting the number of whole unit periods between two dates, starting from the later date back to the earlier date. The Odd Days prompt requires that you enter the number of odd days in excess of full [Unit Periods](#), or, if applicable, the number of odd days in a fractional unit period (i.e., less than a full unit period between two dates).

For combined real estate [construction and permanent](#) loans, the number of unit periods is calculated by dividing the construction period in half and then adding that value to the period from the end of the construction to the first payment in the permanent period. After the number of unit periods is calculated, the odd days are the number of **actual** days remaining after counting the number of whole unit periods between two dates (i.e., the loan date and the date of the first payment in the permanent period).

## [Additional Information](#)

### Odd Days - Additional Information

**Example 1:** If the loan date on a *monthly* payment loan is 10/1/96 and the first payment is due on 11/10/96, there is one whole unit period between 11/10/96 and 10/10/96, and nine odd days between 10/1/96 and 10/10/96.

**Example 2:** The loan date on a biweekly payment loan is 11/1/96 and the first payment is due 12/5/96. There are two unit periods and six odd days between those two dates.

**Example 3:** If the loan date on a *single* payment loan is 10/1/96 and the payment is due on 10/15/97, there is one whole unit period between 10/15/97 and 10/15/96 (a unit period cannot be greater than one year), and 14 odd days between 10/1/96 and 10/15/96.

[Installment Loans](#): If there is a fractional unit period (i.e., less than one unit period between two dates), the odd days entered into the program are the actual number of days between the two dates. For example, if there are 20 days from the loan date to the first payment due date on a monthly payment loan, the number of odd days is 20. February 29 may be ignored.

[Single Advance/Single Payment Loans](#): If the term of the loan is one year or less, the number of odd days will always be zero. If the loan term is measured in days, the number of odd days is the number of days remaining after counting full calendar years from the payment date back to the loan date. If the loan term is measured in full calendar months, the APR programs asks only for the number of months in the loan term.

Details for measuring odd days under the actuarial method are provided in Appendix J to Regulation Z.

**Special Rule for Construction Loans:** Loans that meet the conditions in Appendix D (e.g., real estate construction loans) have special unit period rules. For the purpose of calculating the APR, the number of odd days (and *unit periods*) in the construction period must be divided in half.

**Construction Loan Example:** The [Loan Date](#) on a real estate construction loan is 9/28/96, the [Construction Period End Date](#) is 4/1/97, and the [Amortization Payment Date](#) is 5/15/97. The number of unit periods between the loan date and the first amortization payment is four. The number of odd days is 16. Those unit periods and odd days are arrived at as follows:

Counting back from 4/1/97 to 9/28/96, there are six full calendar months and three odd days in the construction period. Six divided by 2 equals three unit periods. Three days divided by two equals 1.5 days, or two odd days when rounded up. Counting back from 5/15/97 to 4/1/97, there is one full calendar month and 14 odd days. Three plus one equals four whole unit periods. Two plus 14 equals 16 odd days.

See also [Unit Periods](#).