FEDERAL RESERVE BANK
OF NEW YORK

ANNUAL PERCENTAGE RATE DISCLOSURES TO BORROWERS
Comment Invited on Proposed Amendments to Regulation Z

To All Member Banks, and Others Concerned,
 in the Second Federal Reserve District:

The Federal Reserve Board has invited public comment on a number of proposals bearing on disclosure to borrowers of the annual percentage rate (APR) required by the Truth in Lending Law and its implementing Regulation Z. Following is the text of a statement issued by the Board, announcing the proposals:

> Comment is requested by October 15, 1979. After this comment has been analyzed the Board will decide on its final views regarding the proposed revision of the APR disclosure requirements of Regulation Z. The Board's objectives are greater uniformity and accuracy in calculating the APR and increased simplicity in its determination, to enhance the ability of consumers to shop for credit.

> The Board said the lack of uniformity it seeks to correct arises from the ways in which Regulation Z currently deals with two issues: (1) the degree of precision required in calculating and disclosing the annual percentage rate, and (2) the treatment of irregularities in payment amounts and periods.

> In January, the Board requested comment on five issues which the Board believes contribute to lack of uniformity in disclosures of the annual percentage rate and in the treatment of irregularities. Based on the comment received, the Board now proposes revisions of Regulation Z, and other changes, aimed at correcting these conditions.

> In making its proposals, the Board said:

> A review of this matter is appropriate for three reasons. *First,* increased enforcement activities by the Federal agencies . . . have focused attention of both regulators and creditors on the numerous annual percentage rate computation methods now permitted. *Second,* the decade since adoption of Regulation Z has seen an increase in the level of knowledge in the credit industry and in the sophistication of the calculation tools available to creditors which may obviate the need for the numerous options originally allowed to facilitate compliance. *Third,* a thorough review of the annual percentage rate provisions is consistent with current efforts by Congress and the Board to clarify the requirements of the Truth in Lending Act.

> The Board said it is mindful of the costs of changes in Regulation Z that may require investment in calculation tools for determining the annual percentage rate and asked for comment on the extent to which the changes it proposed might increase or decrease the costs of compliance.

> The Board proposed:

> 1. For either open- or closed-end credit, to consider an annual percentage rate accurate if it is within ⅛ of 1 percentage point above or below the correct annual percentage rate determined by reference to Supplement I of Regulation Z (the Board's rules for ascertaining the annual percentage rate). The current rounding rule permits rounding only to the nearest ¼ of 1 percentage point.

> 2. The Board is considering three alternatives to the current provisions of the regulation permitting creditors to ignore certain payment schedule irregularities in determining the annual percentage rate:

> —Eliminate the current provisions and require creditors to disclose a rate that meets the general standard of accuracy of ⅛ of a point below or above the accurate annual percentage rate. This would permit creditors to ignore slight irregularities in payment amounts and periods only if the resulting annual percentage rate falls within this range of tolerance.

> —Continue the current approach and improve the regulatory language by certain consolidations and clarifications.

(OVER)

—Replace the current provisions with a rule that permits a larger degree of overstatement of the disclosed annual percentage rate where the first payment period or the first payment is irregular (not the same as subsequent payment periods or payments). Under this proposal, creditors could treat an initial payment period that is up to two days shorter or 30 days longer than subsequent periods as being regular. Also, an initial payment that is smaller than subsequent schedule payments could be treated as being regular.

In asking for comment on this last alternative the Board said:

In the Board's view, competitive pressures would minimize the deliberate use of such permissible overstatements, and such overstatements (of the disclosed annual percentage rate) are less harmful than understatements (of the disclosed annual percentage rate). However, it must also be noted that any variation from the exact annual percentage rate may tend to impair the consumer's ability to comparison-shop for credit. The Board specifically requests comment on the extent to which this disadvantage to consumers may be balanced by the need for special treatment in these situations.

3. For transactions in which the finance charge is determined solely by application of a simple interest rate, only initial payment periods that are shorter than normal first periods would be treated as regular in computing the finance charge. For such transactions all months could be treated as having the same number of days, if the creditor marked the resulting finance charge as an estimate.

4. Regulation Z recognizes (but does not limit creditors to) two methods of annual percentage rate calculation: The "U.S. Rule" and the "actuarial method" (see Supplement I to Regulation Z for a description of the difference in the two methods).

These two methods would continue to be recognized by Regulation Z and the proposed ⅛ of a point range of tolerance would be measured from the result reached by either of the methods, even though application of the methods may produce slight variations in the annual percentage rate.

5. Regulation Z states that an error in the disclosed annual percentage rate due to a corresponding error in a chart or table used in good faith by a creditor is not a violation. The Board is considering:

A. Extension of this rule to errors resulting from malfunction of the physical components (but not from erroneous software) of calculators or computers.

B. Elimination of the provision.

The Board asked for comment on any inherent difficulties in distinguishing among errors arising from hardware and software.

6. Regulation Z currently permits creditors to understate the true annual percentage rate they disclose by up to 8 percent, where a single finance charge is applied to all balances within a certain range. The annual percentage rate so arrived at must be computed on the median balance within the permitted range of balances. The Board is considering, and requests comment on, two alternatives:

A. Retain this provision, but only for transactions involving orders by mail or telephone and only for the purpose of disclosing the annual percentage rate in a catalogue or other printed matter.

B. Eliminate the provision, on the grounds it is no longer needed.

7. The Board proposed three revisions of Supplement I to Regulation Z: expanding it to include explanations and equations for determining the annual percentage rate by the U.S. Rule as well as by actuarial method; specifying a uniform method for measuring periods that are longer or shorter than other payment periods in a transaction and expanding the number and variety of examples in Supplement I to include a greater variety of types of transactions.

8. The Board's Annual Percentage Rate Tables provide a calculation tool which, when used according to instructions, produces annual percentage rates complying with the Regulation. The Board proposed four revisions of Volume I of the Tables, aimed at making Volume I easier to use and at increasing its accuracy. These proposed revisions cover: adjustments to accommodate certain irregularities in payments or payment periods; adjustments to accommodate the proposed ⅛ of 1 percentage point range of tolerance, rather than the current rounding rule; expansion of the explanatory and introductory text and deletion of appendixes to Volume I the Board believes to be no longer needed (Appendixes B, C and D).

Enclosed—for member banks and others directly involved in this District—is a copy of the full text of the proposal. It will be published in the *Federal Register;* copies will also be furnished upon request directed to our Regulations Division.

Comments on the proposal should be submitted by October 15 and may be sent to our Regulations Division.

THOMAS M. TIMLEN,
First Vice President.

FEDERAL RESERVE SYSTEM

[12 CFR 226]

[Reg. Z; Docket No. R-0239]

Truth in Lending

Calculation and Disclosure of Annual Percentage Rates

AGENCY: Board of Governors of the Federal Reserve System.

ACTION: Proposed rule.

SUMMARY: The Board solicits comment on specific revisions in the requirements
of Regulation Z with regard to the degree of accuracy and treatment of payment
schedule variations in the calculation and disclosure of the annual percent-
age rate as well as other credit terms. These revisions, which are set forth
below, would take the form of amendments to §§ 226.5 and 226.8 of the Regula-
tion, expansion of Supplement I to Regulation Z, and adjustment of Volume I
of the Board's Annual Percentage Rate Tables. The issues addressed by this
notice were the subject of a prior proposal published by the Board in
January, 1979 (44 FR 1116, January 4, 1979). That publication described
certain problems, together with possible alternative solutions, and invited
comment on the existing annual percentage rate provisions. Following analysis
of the comments received on the revisions proposed below, the Board will
publish final regulatory amendments.

DATE: Comment must be received on or before October 15, 1979.

ADDRESS: Secretary, Board of Governors of the Federal Reserve System,
Washington, D. C. 20551.

FOR FURTHER INFORMATION CONTACT: Dolores S. Smith, Section Chief (202-452-2412),
Ellen Maland, Attorney (202-452-3867), or Margaret Stewart, Attorney (202-452-2412),
Division of Consumer Affairs, Board of Governors of the Federal Reserve System,
Washington, D. C. 20551.

SUPPLEMENTARY INFORMATION: On January 4, 1979, the Board solicited comment
on the requirements of Regulation Z with regard to the calculation and dis-
closure of annual percentage rates (44 FR 1116). The annual percentage rate,
which constitutes one of the most important disclosures required by the
Truth in Lending Act, is intended to provide a uniform standard to be used
by consumers in comparing credit sources. It measures the cost of credit
for a given transaction by expressing in percentage terms the relationship
between the amount financed and the finance charge.

        The Truth in Lending Act requires the Board to prescribe rules
regarding calculation and disclosure of the annual percentage rate. To accom-
modate the great variety in the credit industry and to alleviate the diffi-
culties experienced by creditors in adjusting to a totally new calculation

procedure, Regulation Z as originally drafted permitted numerous variations in computation methods. The Board's January proposal focused on five specific issues which the Board believes contribute to a lack of uniformity in the annual percentage rates permissible under the regulation. Those issues related to the degree of accuracy required in calculating and disclosing the annual percentage rate and the treatment of irregularities in payment amounts and periods.

A review of this matter is appropriate for three reasons. First, increased enforcement activities by the federal agencies, particularly the adoption of uniform enforcement guidelines for Regulation Z (44 FR 1221), have focused the attention of both regulators and creditors on the numerous annual percentage rate computation methods now permitted. Second, the decade since adoption of Regulation Z has seen an increase in the level of knowledge in the credit industry and in the sophistication of the calculation tools available to creditors, which may obviate the need for the numerous options originally allowed to facilitate compliance. Third, a thorough review of the annual percentage rate provisions is consistent with current efforts by Congress and the Board to clarify the requirements of the Truth in Lending Act. Because of the impact which changes in the annual percentage rate provisions could have throughout the entire credit industry, the Board in its January proposal requested comment on the problems identified and a number of alternative solutions, prior to proposing any specific regulatory changes.

The Board is mindful of the costs of regulatory change in the area of annual percentage rate determination, which may require an investment in calculation tools. In assessing the economic impact of the amendments, the Board welcomes comment on the extent to which the changes proposed below may increase or decrease the costs of compliance with Regulation Z. The Board particularly solicits information regarding the following issues: (1) the types and numbers of calculation tools used in various segments of the credit industry; (2) any changes in those calculation tools which would be necessitated by the proposed amendments; and (3) the amount of time needed by creditors and calculation tool producers to adjust their procedures and equipment to the proposed revisions, if adopted.

ISSUES ADDRESSED

More than 300 comments were received in response to the Board's proposal. The great majority of the comments were from financial institutions or their representatives; many of them addressed only one or two of the five issues on which comments were solicited. Discussed below are the five issues which the January proposal addressed, the nature of the comments received on that issue and a summary of the action which the Board now proposes to take with regard to that issue.

1. Tolerance

The regulation currently requires that the annual percentage rate for credit transactions be disclosed either as an exact figure or rounded

to the nearest 1/4 of 1 percentage point. As an alternative, the Board proposed a uniform tolerance and requested comment on what degree of tolerance should be permitted, the factors to be considered in applying the tolerance, and the continued need for special rules which countenance greater inaccuracy in certain types of transactions.

A great majority of the commenters addressing this issue favored a fixed 1/8 of 1 percentage point tolerance in either direction from the exact annual percentage rate. The comments as a whole provided very little support for distinctions in the amount of tolerance based on such factors as the type of credit involved, the term of the transaction or the calculation tool employed by the creditor. For example, only eight commenters indicated a need for different tolerances for open end and closed end credit, while just 10 commenters supported distinctions based on the computation tools used. The Board now proposes to specify a fixed tolerance of 1/8 of 1 percentage point, to be applied without regard to type of transaction or other factors.

In discussing this issue, the Board also invited comment on two current provisions which permit creditors using certain methods to assess finance charges to disclose annual percentage rates which may not meet the general accuracy requirements of the regulation. These provisions are contained in § 226.5(c)(2)(iv) and Board Interpretation § 226.502.

Section 226.5(c)(2)(iv) relates to the application of a single finance charge to all balances within a specified range of balances. Under this provision, a creditor may understate the annual percentage rate by up to 8% of the actual rate, by disclosing for all such balances the annual percentage rate computed on the median balance within that range. Interpretation § 226.502 permits creditors applying a single add-on rate to all transactions up to 60 months in length to disclose the same annual percentage rate for all those transactions, although the actual annual percentage rate varies according to the length of the transaction. Of the 47 commenters addressing this issue, 41 indicated that no special treatment should be accorded these types of transactions.

The Board now requests comment on two alternative courses of action with regard to these provisions. First, the Board may retain either or both of these rules in a limited form, as set forth below in § 226.5(a). Second, the Board may rescind these provisions entirely if the comments indicate no further need for them.

2. Number of Decimal Places

The Board's January proposal requested comment on whether the regulation should specify the number of decimal places to be used in calculating and disclosing the annual percentage rate. The Board stated that it was considering adoption of a rule that would require disclosure of an annual percentage rate rounded to two decimal places for all transactions and disclosure of an exact periodic rate on open end credit disclosures. Of the

112 commenters addressing the issue, 87 favored disclosure of an annual percentage rate to two places. Only 16 commenters addressed the proposal that open end periodic rates be disclosed exactly, and they were evenly divided on the need for such a rule.

In the Board's view, specification of the exact number of decimal places is unnecessary, since creditors can judge for themselves the degree of precision needed to meet the accuracy requirements of the regulation. The Board now proposes to specify the number of decimal places only with respect to disclosure of the periodic rate in open end credit, because this rate is more sensitive to the effects of rounding or truncating decimal places.

3. Ignoring Irregularities

The Board requested comment regarding the current minor irregularities provisions which permit creditors to disregard certain variations in payment amounts and periods in order to simplify calculation of the annual percentage rate and finance charge. Use of these provisions necessarily produces inaccurate disclosures, and the Board proposed four alternatives to the present rules: (1) eliminate them entirely; (2) restrict their use to cases where the resulting inaccuracy produces an overstatement; (3) retain the provisions with only editorial changes; or (4) add a new provision to cover certain payment schedule irregularities not now addressed.

Most commenters strongly urged the Board to retain the current minor irregularities provisions in some form. Twenty-three commenters favored their deletion while nine commenters expressed support for revising the provisions to permit only overstatements.

The fourth alternative addresses two business practices which may produce slight payment schedule variations--rounding of payment amounts to whole cents and changing the dates of scheduled payments and advances which fall on a Saturday, Sunday or holiday. Sixty-four commenters expressed support for this option, either in addition to or in substitution for the current provisions. The Board now proposes to amend Regulation Z to permit all creditors in closed end credit transactions to disregard the effects of these two practices in making disclosures. In addition, the Board proposes to adopt a special rule to simplify calculation and disclosure of the finance charge and other credit terms by creditors in closed end credit transactions assessing finance charges on a simple interest basis. Both of these provisions would apply to all credit terms, not merely the annual percentage rate.

With regard to the current minor irregularities provisions applicable to the annual percentage rate, the Board is considering three alternative courses of action: (1) eliminate § 226.5(d) and Interpretation § 226.503, (2) permit a relatively large degree of overstatement and a much narrower tolerance for understatements, or (3) retain both provisions with only editorial and organizational changes.

With regard to Interpretation § 226.505, which addresses minor irregularities in calculation and disclosure of the finance charge in certain simple interest transactions, the Board proposes to replace it with a provision in § 226.8 allowing shorter than regular first periods to be disregarded.

4. Accounting for Irregularities

The Board requested comment on a proposal to specify a uniform method for determining the number of odd days in an irregular interval and relating that number to a regular period. The regulation currently specifies no particular method for accounting for intervals between advances or payments which are longer or shorter than the regular unit period for the transaction. The 90 comments on this issue were almost evenly divided on whether uniformity is necessary. Those opposed indicated that the variations produced by the use of different counting methods were not significant enough to warrant regulation, and also expressed a belief that requiring a specific method would eliminate the payment schedule flexibility which consumers desire.

The Board believes that a uniform approach for counting odd days is warranted, since a uniform method would materially simplify application of Supplement I to transactions involving odd periods and would facilitate verification of annual percentage rates in enforcement procedures. The Board proposes to revise Supplement I of Regulation Z to specify a method for determining the length of an irregular period. Creditors would not be required to use this method in counting odd days, so long as the manner in which they account for irregularities produces a rate within the tolerance limits of the regulation.

5. Reliance on Charts and Tables

The regulation currently provides that an annual percentage rate or finance charge error that results from an error in a chart or table used by the creditor does not violate Regulation Z. The Board requested comment on two alternative provisions: (1) rescind the provision entirely, making creditors liable for finance charge and annual percentage rate errors without regard to the source of those errors, or (2) extend the provision to apply not only to users of erroneous charts or tables but also to creditors using faulty software or faulty calculators. The great majority addressing this issue favored extending the protection of this provision to creditors using any computation tool. The Board proposes to retain this provision and extend its application to creditors using calculators or computers which have faulty hardware. Because of the difficulty of tracing errors in software and the extent to which software is under the control of the creditor, the Board does not believe that this protection should be further extended to such errors. As an alternative, the Board may eliminate this provision, if further analysis indicates it is unnecessary.

DISCUSSION OF PROPOSED REVISIONS

In order to implement revisions in the provisions relating to calculation and disclosure of the annual percentage rate and other credit terms, the Board proposes to substantially amend § 226.5, add new paragraphs (r) and (s) to § 226.8, and revise Supplement I to Regulation Z and Volume I of the Board's Annual Percentage Rate Tables. The text of all of these revisions is set forth following a discussion of the proposed changes. The Board emphasizes that if these proposals are adopted, an extended period will be provided for creditors and manufacturers of computation tools to adjust to the new provisions.

1. Section 226.5

The Board proposes to revise the current § 226.5 relating to calculation and disclosure of the annual percentage rate, as set forth below in the section captioned "TEXT OF PROPOSED AMENDMENTS." The Board wishes to draw particular attention to the following aspects of these provisions:

(1) For closed end credit, a fixed tolerance of 1/8 of 1 percentage point in either direction from the annual percentage rate as determined according to Supplement I is substituted for the current rule requiring disclosure of either an exact rate or a rate rounded to the nearest 1/4 of 1 percentage point. For example, where the annual percentage rate is determined to be 10 1/8%, a disclosed annual percentage rate from 10% to 10 1/4%, or the decimal equivalent, would be deemed to comply with the regulation. See proposed § 226.5(a)(1) below.

(2) Section 226.5(d) and Interpretation § 226.503 of the current regulation permit creditors to ignore certain payment schedule irregularities for the purpose of determining the annual percentage rate. Use of these provisions necessarily produces distortion, the degree of inaccuracy varying with the degree of the irregularity, the rate, and the term. The most common irregularity is a first period which is either longer or shorter than the regular period for the transaction. For example, on a 12-payment loan with a contract rate of 9%, the true annual percentage rate is 9.49% if the first period is only 20 days long and 8.15% if the first period is 50 days long. In both cases the annual percentage rate may be disclosed as 9% under the current minor irregularities provisions—an understatement of .49% and an overstatement of .85%, respectively. The Board is considering three alternative proposals and specifically solicits comments on each of them:

Option 1 - Eliminate the current provisions and require creditors to disclose a rate which meets the general standard of accuracy of 1/8 of 1 percentage point in either direction from the accurate annual percentage rate. If this alternative is adopted, creditors could ignore slight irregularities in payment amounts and periods only if the resulting annual percentage rate falls within this tolerance. Creditors could also account for the irregularities by making an adjustment of the rate, such as that described in the proposed appendix to Volume I of the Board's Annual Percentage Rate Tables.

Option 2 - Continue the current approach and simply improve the
regulatory language. If the Board decides that the current provisions regard-
ing minor irregularities best meet the needs of creditors and consumers, the
Board would consolidate the present § 226.5(d) and Interpretation § 226.503
and clarify them through editorial revisions. The Board solicits comment
on specific improvements which might be made in the current provisions.

Option 3 - Replace the current provisions with a rule which permits
a larger degree of overstatement where the first period or first payment is
irregular. Under this rule, creditors could treat as regular an initial
period which is up to two days shorter or 30 days longer than a regular
period. For example, a creditor in a transaction payable monthly could con-
sider a first period which is from 28 to 60 days long to be a 30-day period
for purposes of computing and disclosing the annual percentage rate. In
addition, this rule would permit an initial payment which is smaller than
regular to be treated as regular. The general rule proposed in § 226.5(a)(1)
regarding the degree of accuracy required may in some cases allow a creditor
to ignore a larger degree of irregularity than that described in this special
rule and still remain within the proposed 1/8 of 1 percentage point tolerance.
The creditor could rely on whichever of these provisions provides more flexi-
bility in dealing with these irregularities.

In the Board's view, competitive pressures would minimize the
deliberate use of such permissible overstatements, and such overstatements
are less harmful than understatements. However, it must also be noted that
any variation from the exact annual percentage rate may tend to impair the
consumer's ability to comparison-shop for credit. The Board specifically
solicits comment on the extent to which this disadvantage to consumers may
be balanced by the need for special treatment in these situations.

This option, if adopted by the Board, would be implemented by
§ 226.5(a)(5), set forth below.

(3) For transactions in which the finance charge is determined
solely by application of a simple interest rate, the Board proposes to per-
mit only shorter than normal first periods to be treated as regular. If
this approach were adopted, Interpretation § 226.505 would be deleted and
replaced by § 226.8(r)(2).

(4) The regulation currently discusses two methods of rate cal-
culation, the U.S. Rule and the actuarial method. The U.S. Rule differs
from the actuarial method in two respects. First, interest which is unpaid
at the end of the regular payment period is not compounded by addition of
the deficiency to the principal of the obligation. Second, in a payment
period longer than the regular period, interest is calculated on a "simple"
basis for the entire period. The regulation continues to recognize explicitly
these two methods. The proposed tolerance of 1/8 of 1 percentage point would
be measured from whichever of these calculation methods is being used, even
though application of these two methods may produce slight variations in the
resulting annual percentage rate. It must be emphasized that creditors are

not limited to the use of these two methods. The regulation does not specify the way in which creditors must calculate their rates, but rather what methods will be used in measuring the accuracy of those rates. See proposed § 226.5(a)(1) and proposed Supplement I.

(5) The current § 226.5(c)(2)(iv) permits creditors to understate the true annual percentage rate by as much as 8% of that rate, where a single finance charge is applied to all balances within a specified range of balances. The creditor in such cases is permitted to disclose for all such balances the annual percentage rate computed on the median balance within that range. The Board is considering two alternative courses of action: (1) retain this provision, but limit its availability to transactions involving orders by mail or telephone, and only for purposes of disclosing the annual percentage rate in the catalogue or other printed material in which the credit terms are initially set forth; and (2) eliminate the exception entirely, on the grounds that it is no longer needed. The Board requests comment on these options. See proposed § 226.5(a)(4) below, which would implement the first alternative.

(6) Interpretation § 226.502 currently permits creditors applying a single add-on rate to all transactions up to 60 months in length to disclose the same annual percentage for all those transactions. Creditors utilizing this provision must disclose the highest of those annual percentage rates, which results in an overstatement for other maturities. In view of the fact that the distortion is greatest in transactions with maturities shorter than nine months, the Board proposes to limit the availability of this provision to transactions which range in length from nine to 60 months. However, as an alternative to limiting the provision in this fashion, the Board also solicits comment on whether it could be eliminated entirely. See proposed § 226.5(a)(3) below, which would implement the first alternative.

(7) As discussed above, the Board is considering a revision of the present § 226.5(c)(3), which relates to the use of faulty calculation tools, to extend its application to errors resulting from calculators and and computers. In view of the increasing use of calculators and computers in the credit industry, it may not be appropriate to limit the protection afforded by § 226.5(c)(3) solely to users of charts and tables. However, the Board recognizes that there may be greater difficulty in confirming errors in calculators and computers than in printed material such as charts and tables. Therefore, if this provision is retained and extended to calculators and computers, the Board is considering limiting the extension to the "hardware" or physical components which are beyond the control of the creditor. Proposed § 226.5(c), as set forth below, reflects this alternative. The Board requests comment on any practical difficulties inherent in drawing a distinction between errors arising from hardware and those arising from software. As an alternative, the Board may also consider deleting this provision entirely, if further analysis indicates that its protection is no longer warranted.

(8) Section 226.5(e) of the current regulation permits very limited use of the constant ratio method in exceptional instances where the creditor has no alternative to using a method other than the actuarial method or the U.S. Rule. The constant ratio method is a means of approximating the annual percentage rate by assumming that each payment in the credit transaction is composed of the same amount of interest and principal. While this method is relatively simple to use, it may produce an extremely inaccurate annual percentage rate in regular transactions with longer terms or higher rates. In transactions involving payment schedule irregularities, application of this method tends to produce extremely distorted rates. The comments on the Board's January proposal do not indicate any use of this method in the credit industry. The Board therefore proposes to rescind § 226.5(e).

(9) The provisions relating to open end credit would be essentially unchanged from the current requirements of § 226.5(a), except for the addition of language permitting a fixed 1/8 of 1 percentage point tolerance analogous to that proposed for closed end credit transactions. See proposed § 226.5(b)(1) below.

2. Section 226.8

Most exceptions and special rules involving annual percentage rate determination are based on the assumption that creditors have no difficulty in computing the amount of the finance charge, which must then be converted to an annual percentage rate. However, the information available to the Board indicates that a growing segment of the credit industry is using a simple interest basis to compute the finance charge. Under this approach, a rate is applied to an outstanding balance for the actual number of days elapsing between payments. For these creditors, the difficulty is ordinarily not in calculating the annual percentage rate, which, in the absence of other finance charges, is the same as the interest rate, but in determining the dollar amount of the finance charge. This difficulty arises from the fact that the dollar amount will vary according to the month in which the loan commences, because of the variations in the length of the months.

Irregularities in the first period in a transaction of this type produce similar difficulties, because the length of the first period determines how much of the initial payment will be attributed to interest. This in turn affects the rate at which the principal of the loan is reduced, and thus the amount of the final payment and of the total finance charge.

To alleviate the first difficulty described above, the Board proposes to permit creditors assessing finance charges solely by application of a simple interest rate to treat all months as having the same number of days, provided the finance charge so calculated is marked as an estimate.

With regard to irregularities in the first period for these types of transactions, the Board is considering adoption of a provision permitting only overstatements. Under this approach, a first period of any length less

than a regular period could be treated as regular and any resulting payment irregularities disregarded in disclosing the finance charge, schedule of payments and total of payments. This provision would replace Interpretation § 226.505.

These provisions would be implemented by proposed § 226.8(r) (Certain simple interest obligations), set forth below. It should be noted that the exceptions would not be available if the finance charge in such transactions includes charges other than amounts attributable to a simple interest rate.

In all types of transactions, two common and necessary business practices produce very slight payment schedule irregularities affecting the amount of several required disclosures under the Truth in Lending Act. One variation arises from the fact that payments must be collected in whole cents rather than in fractions of pennies. For example, the rounding of payments to whole cents may produce a difference between the final payment and all other payments. The other variation arises from the need to change the dates of scheduled payments and/or advances because the scheduled date occurs on a Saturday, Sunday or holiday. The variations arising from these practices may have a slight impact not only on the annual percentage rate but on certain non-rate disclosures such as the finance charge, the total of payments and the schedule of payments. Therefore, the Board proposes to adopt a provision permitting the effects of these two practices to be disregarded by all creditors, regardless of the method used to assess interest, in making the required Truth in Lending disclosures. Section 226.8 of Regulation Z would be amended by the addition of a new paragraph (s) as set forth below.

The Board believes that the difficulties described above arise only in closed end credit transactions and therefore proposes to limit proposed paragraphs (r) and (s) to such transactions. However, the Board solicits comment on whether these provisions should also apply to open end credit transactions.

3. Supplement I

Supplement I, which is incorporated by reference in Regulation Z, sets forth the technical equations and instructions for determining the annual percentage rate. As currently written, the material is based on the use of the actuarial method, although the regulation specifically sanctions the use of both this method and the U.S. Rule. The U.S. Rule approach is more commonly used by credit unions. In order to make Supplement I more comprehensive the Board proposes three revisions. First, it would be expanded to include explanations and equations for determining the annual percentage rate in accordance with the U.S. Rule. Second, the Supplement would specify a uniform method for measuring periods which are longer or shorter than the regular unit period for a transaction. Third, the number and variety of examples in Supplement I would be expanded in order to illustrate the application of the formulas in Supplement I to various

types of transactions. Set forth below is the text of the proposed Supplement I equations and explanations, together with examples for representative types of transactions.

4. Volume I of Board's Tables

The Board's Annual Percentage Rate Tables, which are based on the formulas in Supplement I, provide creditors with a calculation tool which, when used in accordance with the instructions, produces an annual percentage rate complying with the regulation. When used for a regular transaction, that is, one involving equal payment amounts and periods, Volume I provides a simple means of calculating an annual percentage rate accurate to within the nearest 1/4 of 1 percentage point. Using the adjustments set forth in Appendix A of the Tables, creditors may also utilize Volume I for transactions with certain irregularities in the first period and/or in the first and last payments. These adjustments may produce inaccuracies beyond the proposed tolerance, but their use is specifically sanctioned by the regulation to accommodate these irregularities.

In order to facilitate the use of the Tables while at the same time increasing the accuracy of the annual percentage rate obtained thereby, the Board proposes four major revisions in Volume I. First, Appendix A of the Tables would be amended in such a way that the adjustments needed to accommodate certain irregularities would produce a more accurate annual percentage rate in many transactions and reduce the possibility of understatement. Second, the general rate tables in Volume I, which are currently printed in 1/4 of 1 percentage point columns, would be reprinted in 1/8 of 1 percentage point intervals. Third, the introductory material accompanying Volume I would be expanded in order to provide a further explanation of the scope of the volume, the types of transactions to which it applies and instructions for use of the volume. Fourth, Appendices B, C and D would be deleted. Appendix B relates to determination of the finance charge. The Board believes that this appendix is not appropriate for Volume I, which was designed as a tool for calculation of the annual percentage rate only. Portions of Appendix C would be incorporated into an expanded introduction to Volume I. Appendix D, which discusses the degree of inaccuracy resulting from use of the adjustments in the current Appendix A, will no longer be applicable if the proposed revisions to Appendix A are adopted.

The Board wishes to emphasize that, if adopted, the changes in Volume I would not materially affect the manner in which it is used for regular transactions. Similarly, the procedures called for by the new Appendix to provide greater accuracy in annual percentage rates for irregular transactions should not materially increase the complexity of the adjustments. Following the text of the proposed amendments, set forth below, is the text of the revised Appendix to Volume I, together with the special factor table to be used in making adjustments.

TEXT OF PROPOSED AMENDMENTS

In consideration of the comments received and its own analysis, and pursuant to the authority granted in 15 U.S.C. § 1604, the Board now proposes to delete 12 CFR §§ 226.502, 226.503 and 226.505 and to amend 12 CFR Part 226 to read as follows:

<div align="center">*   *   *   *   *</div>

§ 226.5 -- DETERMINATION OF ANNUAL PERCENTAGE RATE

(a) Credit other than open end. (1) General rule. The annual percentage rate is a measure of the cost of credit, expressed as a yearly rate, which relates the amount and timing of value received by the consumer to the amount and timing of payments made. The correct annual percentage rate shall be that rate determined in accordance with either the actuarial method or the United States Rule method. Explanations, equations and technical instructions for determining the annual percentage rate in accordance with these methods are set forth in Supplement I, which is incorporated in this Part by reference. An annual percentage rate shall be considered accurate if it is not more than one-eighth of one percentage point below or above the annual percentage rate determined in accordance with Supplement I.

(2) Computation tools. (i) The Regulation Z Annual Percentage Rate Tables produced by the Board may be used to determine the annual percentage rate, and any such rate determined from these tables in accordance with the instructions contained therein will comply with the requirements of this section. Volume I of the tables applies to single advance transactions involving up to 480 monthly payments or 104 weekly payments. It may be used for regular transactions, as well as transactions with any of the following variations: an odd first period, an odd first payment and an odd final payment. Volume II applies to transactions involving multiple advances and any type of payment or period irregularity.

(ii) Creditors may use any other computation tool in determining the annual percentage rate so long as the annual percentage rate so determined equals the annual percentage rate determined in accordance with Supplement I, within the degree of accuracy set forth in paragraph (a)(1) of this section.

(iii) Supplement I and Volumes I and II may be obtained from any Federal Reserve Bank or from the Board in Washington, D.C. 20551.

(3) Single add-on rate transactions. If a single add-on rate is applied to all transactions within a range of maturities from 9 to 60 months and if all payments are equal in amount and period, a single annual percentage rate may be disclosed for all such transactions, provided that it is the highest annual percentage rate for any such transaction.

(4) <u>Certain transactions involving ranges of balances</u>. For purposes of disclosing the annual percentage rate required by § 226.8(g)
(Orders by mail or telephone), if the same finance charge is imposed on all
balances within a specified range of balances, the annual percentage rate
computed for the median balance may be disclosed for all of the balances.
However, if the annual percentage rate computed for the median balance understates the annual percentage rate computed for the lowest balance by more
than 8% of the latter rate, the annual percentage rate shall be computed
on whatever lower balance will produce an annual percentage rate which does
not result in an understatement of more than 8% of the rate determined on the
lowest balance.

(5) <u>Payment schedule irregularities</u>. In calculating and disclosing the annual percentage rate, a creditor may treat as regular the following irregularities in the payment schedule:

(i) a period between the date on which the finance charge begins
to accrue and the date of the first scheduled payment which is not more than
2 days shorter or 30 days longer than a regular period; and

(ii) an initial payment which is less than other payments.

(b) <u>Open end credit</u>. (1) <u>General rule</u>. The annual percentage
rate is a measure of the cost of credit, expressed as a yearly rate, computed
in accordance with paragraph (b)(2) or (b)(3) of this section, as applicable.
An annual percentage rate shall be considered accurate if it is not more
than 1/8 of 1 percentage point below or above the annual percentage rate
determined in accordance with this section.

(2) <u>Annual percentage rate in advertising and initial disclosures</u>.
Where one or more periodic rates may be used to compute the finance charge,
the annual percentage rate to be disclosed pursuant to § 226.7(a)(4) and
§ 226.10(c)(4) shall be computed by multiplying each such periodic rate
by the number of periods in a year.

(3) <u>Annual percentage rate in periodic statements</u>. (i) The
annual percentage rate to be disclosed pursuant to § 226.7(b)(1)(v) shall
be determined by multiplying each periodic rate that may be used to compute
the finance charge by the number of periods in a year.

(ii) The annual percentage rate to be disclosed pursuant to
§ 226.7(b)(1)(vi) shall be determined in accordance with one of the following methods, as applicable:

(A) Where the finance charge is exclusively the product of the
application of one or more periodic rates

(I) by multiplying each periodic rate by the number of periods in
a year; or

(II) at the creditor's option, if the finance charge is the result of the application of two or more periodic rates, by dividing the total finance charge for the billing cycle by the sum of the balances to which the periodic rates were applied and multiplying the quotient (expressed as a percentage) by the number of billing cycles in a year.

(B) Where the creditor imposes all periodic finance charges in amounts based on specified ranges or brackets of balances, the periodic rate shall be determined by dividing the amount of the finance charge for the period by the amount of the median balance within the range or bracket of balances to which it is applicable, and the annual percentage rate shall be determined by multiplying that periodic rate (expressed as a percentage) by the number of periods in a year. However, if the annual percentage rate computed for the median balance understates the annual percentage rate computed for the lowest balance by more than 8% of the latter rate, the annual percentage rate shall be computed on whatever lower balance will produce an annual percentage rate which does not result in an understatement of more than 8% of the rate determined on the lowest balance.

(C) Where the finance charge imposed during the billing cycle is or includes

(I) any minimum, fixed or other charge not due to the application of a periodic rate, other than a charge with respect to any specific transaction during the billing cycle, by dividing the total finance charge for the billing cycle by the amount of the balance(s) to which applicable and multiplying the quotient (expressed as a percentage) by the number of billing cycles in a year; or

(II) any charge with respect to any specific transaction during the billing cycle (even if the total finance charge also includes any other minimum, fixed or other charge not due to the application of a periodic rate), by dividing the total finance charge imposed during the billing cycle by the total of all balances and other amounts on which any finance charge was imposed during the billing cycle without duplication and multiplying the quotient (expressed as a percentage) by the number of billing cycles 5a

in a year, except that the annual percentage rate shall not be less than the largest rate determined by multiplying each periodic rate imposed during the billing cycle by the number of periods in a year; or

(III) any minimum, fixed or other charge not due to the application of a periodic rate and the total finance charge imposed during the billing cycle does not exceed 50 cents for a monthly or longer billing cycle, or the pro rata part of 50 cents for a billing cycle shorter than

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5a [Footnote would be unchanged.]

monthly, at the creditor's option, by multiplying each applicable periodic
rate by the number of periods in a year, notwithstanding the provisions
of paragraph (b)(3)(ii)(C)(I) and (II) of this section.

(c) Errors in calculation tools. An error in disclosure of the
annual percentage rate or finance charge shall not, in itself, be considered
a violation of this Part if

(1) the error resulted from a corresponding error in a chart
or table or in the physical component of a calculator or computer used
in good faith by the creditor, and

(2) upon discovery of the error, the creditor promptly

(i) discontinues use of that calculation tool for disclosure
purposes, and

(ii) notifies the Board in writing of the error in the calculation
tool.

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§ 226.8 -- CREDIT OTHER THAN OPEN END -- SPECIFIC DISCLOSURES

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(r) Certain simple interest obligations. If the finance charge
of an obligation is calculated solely by applying a simple interest rate to
a balance for the actual number of days elapsing between payments or between
advances and payments, the creditor may, at its option, take advantage of
either or both of the following provisions in determining and disclosing
the amount of the finance charge and other credit terms:

(1) Variations resulting from the differing number of days in
months need not be taken into account, provided any finance charge disclosed
pursuant to this provision is labelled as an estimate.

(2) Where the obligation is otherwise repayable in instalments
scheduled at equal periods, the interval between the date on which the
finance charge begins to accrue and the date of the first scheduled payment
may be treated as regular, provided that the length of this interval
is less than a regular period.

(s) Certain payment schedule variations. In making calculations
and disclosures, the creditor need not take into account the effects of
the following:

(1) The fact that payments must be collected in whole cents; and

(2) The fact that the dates of scheduled payments and advances
must be changed because the scheduled date falls on a Saturday, Sunday,
or holiday.

*   *   *   *   *

SUPPLEMENT I TO REGULATION Z

Rules for Determining the Annual Percentage Rate
for Other than Open End Credit Transactions
Pursuant to § 226.5(a) of Regulation Z

I. INTRODUCTION

Section 226.5(a) of Regulation Z provides that the annual
percentage rate for other than open end credit transactions shall be
determined in accordance with either the the actuarial method or the
United States Rule method. This supplement contains an explanation
of these methods as well as equations, instructions and examples of
how these methods apply to single advance and multiple advance
transactions and transactions involving required deposit balances (as
defined in § 226.8(e) of the regulation).

Actuarial Method. Under the actuarial method, at the end of
each unit-period (or fractional unit-period) the unpaid balance of the
amount financed shall be increased by the finance charge accrued during
such period and shall be decreased by the total payment (if any) made
at the end of such period. The determination of unit-periods and frac-
tional unit-periods shall be consistent with the definitions and rules
in Sections II (C) and II (D) and the general equation in Section II (H).

United States Rule Method. Under the United States Rule
method, at the end of each payment period, the unpaid balance of the
amount financed shall be increased by the finance charge accrued during
such payment period and shall be decreased by the payment made at the
end of such payment period. If the payment is less than the finance
charge accrued, the adjustment of the unpaid balance of the amount
financed shall be postponed until the end of the next payment period.
If at that time the sum of the two payments is still less than the total
accrued finance charge for the two payment periods, the adjustment of
the unpaid balance of the amount financed shall be postponed still another
payment period, and so forth. In all cases, however, the time interval
between the date of consummation and the first addition of accrued finance
charge to the unpaid balance of the amount financed, or between successive
additions of accrued finance charge to the unpaid balance of the amount
financed, shall not exceed 1 year.

II. ACTUARIAL METHOD

(A) General rule. The annual percentage rate shall be the
nominal annual percentage rate determined by multiplying the unit-period
rate by the number of unit-periods in a year.

(B) Term of the transaction. The term of the transaction begins
on the date of its consummation, except that if the finance charge or any
portion of it is earned beginning on some other date, the term begins
on that other date. The term ends on the date the last payment is due,
except that if an advance is scheduled after that date, the term ends on
the later date. For computation purposes, the length of the term shall
be equal to the time interval between any point in time on the beginning
date to the same point in time on the ending date.

(C) Definitions of time intervals.

(1) A period is the interval of time between advances or
between payments and includes the interval of time between the date the
finance charge begins to be earned and the date of the first advance there-
after or the date of the first payment thereafter, as applicable.

(2) A common period is any period that occurs more than
once in a transaction.

(3) A standard interval of time is a day, week, semimonth,
month, or a multiple of a week or a month up to, but not exceeding, 1 year.

(4) All months shall be considered equal. Full months shall
be measured from any point in time on a given date of a given month to the
same point in time on the same date of another month. If a series of pay-
ments (or advances) is scheduled for the last day of each month, months
shall be measured from the last day of the given month to the last day of
another month. If payments (or advances) are scheduled for the 29th or 30th
of each month, the last day of February shall be used when applicable.

(D) Unit-period.

(1) In all transactions other than a single advance, single
payment transaction, the unit-period shall be that common period, not to
exceed 1 year, that occurs most frequently in the transaction, except that

(a) If 2 or more common periods occur with equal frequency,
the smaller of such common periods shall be the unit-period; or

(b) If there is no common period in the transaction, the
unit-period shall be that period which is the average of all periods
rounded to the nearest whole standard interval of time. If the average
is equally near 2 standard intervals of time, the lower shall be the
unit-period.

(2) In a single advance, single payment transaction, the
unit-period shall be the term of the transaction, but shall not exceed 1 year.

(E) Number of unit-periods between 2 given dates.

(1) The number of days between 2 dates shall be the number
of 24-hour intervals between any point in time on the first date to the
same point in time on the second date.

(2) If the unit-period is a month, the number of full unit-
periods between 2 dates shall be the number of months measured back from
the later date. The remaining fraction of a unit-period shall be the num-
ber of days measured forward from the earlier date to the beginning of the
first full unit-period, divided by 30. If the unit-period is a month,
there are 12 unit-periods per year.

(3) If the unit-period is a semimonth or a multiple of a
month not exceeding 11 months, the number of days between 2 dates shall
be 30 times the number of full months measured back from the later date,
plus the number of remaining days. The number of full unit-periods and
the remaining fraction of a unit-period shall be determined by dividing
such number of days by 15 in the case of a semimonthly unit-period or by
the appropriate multiple of 30 in the case of a multimonthly unit-period.
If the unit-period is a semimonth, the number of unit-periods per year
shall be 24. If the number of unit-periods is a multiple of a month, the
number of unit-periods per year shall be 12 divided by the number of months
per unit-period.

(4) If the unit-period is a day, a week, or a multiple of a
week, the number of full unit-periods and the remaining fraction of a unit-
period shall be determined by dividing the number of days between the 2
given dates by the number of days per unit-period. If the unit-period is
a day, the number of unit-periods per year shall be 365. If the unit-period
is a week or a multiple of a week, the number of unit-periods per year shall
be 52 divided by the number of weeks per unit-period.

(5) If the unit-period is a year, the number of full unit-
periods between 2 dates shall be the number of full years (each equal to
12 months) measured back from the later date. The remaining fraction of a
unit-period shall be

> (a) The remaining number of months divided by 12 if the
> remaining interval is equal to a whole number of
> months, or

> (b) The remaining number of days divided by 365 if the
> remaining interval is not equal to a whole number of months.

(6) In a single advance, single payment transaction in which the term is less than a year and is equal to a whole number of months, the number of unit-periods in the term shall be 1, and the number of unit-periods per year shall be 12 divided by the number of months in the term.

(7) In a single advance, single payment transaction in which the term is less than a year and is <u>not</u> equal to a whole number of months, the number of unit-periods in the term shall be 1, and the number of unit-periods per year shall be 365 divided by the number of days in the term.

(F) <u>Percentage rate for fraction of a unit-period</u>. The percentage rate of finance charge for a fraction (less than 1) of a unit-period shall be equal to such fraction multiplied by the percentage rate of finance charge per unit-period.

(G) <u>Symbols</u>. The symbols used to express the terms of a transaction in the equation set forth in Section (H) are defined as follows:

A_k = The amount of the kth advance.

q_k = The number of full unit-periods from the beginning of the term of the transaction to the kth advance.

e_k = The fraction of a unit-period in the time interval from the beginning of the term of the transaction to the kth advance.

m = The number of advances.

P_j = The amount of the jth payment.

t_j = The number of full unit-periods from the beginning of the term of the transaction to the jth payment.

f_j = The fraction of a unit-period in the time interval from the beginning of the term of the transaction to the jth payment.

n = The number of payments.

i = The percentage rate of finance charge per unit-period.

Symbols used in the examples shown in this supplement are defined as follows:

$\ddot{a}_{\overline{x}}$ = The present value of 1 per unit-period for x unit-periods, first payment due immediately.

$$= 1 + \frac{1}{(1+i)} + \frac{1}{(1+i)^2} + \ldots\ldots\ldots + \frac{1}{(1+i)^x}$$

w = The number of unit-periods per year.

I = $wi \times 100$ = The nominal annual percentage rate.

(H) <u>General equation</u>. The following equation sets forth the relationship among the terms of a transaction:

$$\frac{A_1}{(1+e_1 i)(1+i)^{q_1}} + \frac{A_2}{(1+e_2 i)(1+i)^{q_2}} + \ldots + \frac{A_m}{(1+e_m i)(1+i)^{q_m}} =$$

$$\frac{P_1}{(1+f_1 i)(1+i)^{t_1}} + \frac{P_2}{(1+f_2 i)(1+i)^{t_2}} + \ldots + \frac{P_n}{(1+f_n i)(1+i)^{t_n}}$$

(I) <u>Solution of general equation by iteration process</u>. The general equation in Section (H), when applied to a simple transaction in which a loan of $1000 is repaid by 36 monthly payments of $33.61 each, takes the special form:

$$A = \frac{33.61\, \ddot{a}_{\overline{36}|}}{(1+i)}$$

Step 1: Let I_1 = estimated annual percentage rate =   12.50 %

Evaluate expression for A, letting $i = I_1/(100w)$ =   .010416667

Result (referred to as A') =   1004.674391

Step 2: Let $I_2 = I_1 + .1$ =   12.60 %

Evaluate expression for A, letting $i = I_2/(100w)$ =   .010500000

Result (referred to as A'') =   1003.235366

Step 3: Interpolate for I (annual percentage rate):

$$I = I_1 + .1\,\frac{(A - A')}{(A'' - A')}$$

$$= 12.50 + .1\,\frac{(1000.000000 - 1004.674391)}{(1003.235366 - 1004.674391)} = \quad 12.82483042\ \%$$

Step 4: First iteration, let I_1 = 12.82483042 % and repeat

Steps 1, 2, and 3 obtaining a new I = 12.82557859 %

Second iteration, let I_1 = 12.82557859 % and repeat

Steps 1, 2, and 3 obtaining a new I = 12.82557529 %

In this case, no further iterations are required to obtain the annual percentage rate correct to two decimal places, 12.83%.

When the iteration approach is used, it is expected that calculators or computers will be programmed to carry all available decimals throughout the calculation and that enough iterations will be performed to make virtually certain that the annual percentage rate obtained, when rounded to two decimals, is correct.

Annual percentage rates in the examples below were obtained by using a 10 digit programmable calculator and the iteration procedure described above.

(J) <u>Single advance transaction, with or without an odd first period, and otherwise regular</u>. The general equation in Section (H) can be put in the following special form for this type of transaction:

$$A = \frac{1}{(1+fi)(1+i)^t} \left(P \, \ddot{a}_{\overline{n}|} \right)$$

<u>Example (J)(1)</u>: Monthly payments (regular first period)

Amount advanced (A) = $5000. Payment (P) = $230.
Number of payments (n) = 24
Unit-period = 1 month. Unit-periods per year (w) = 12.
Advance, 1-10-78. First payment, 2-10-78.
From 1-10-78 through 2-10-78 = 1 unit-period. (t = 1; f= 0)
Annual percentage rate (I) = wi = 9.69 %

Example (J)(2): Monthly payments (long first period)

        Amount advanced (A) = $6000. Payment (P) = $200.
        Number of payments (n) = 36.
        Unit-period = 1 month.   Unit-periods per year (w) = 12.
        Advance, 2-10-78. First payment, 4-1-78.
        From 3-1-78 through 4-1-78 = 1 unit-period. (t = 1)
        From 2-10-78 through 3-1-78 = 19 days. (f = 19/30)
        Annual percentage rate (I) = wi = 11.82%

Example (J)(3): Semimonthly payments (short first period)

        Amount advanced (A) = $5000. Payment (P) = $219.17.
        Number of payments (n) = 24.
        Unit-period = 1/2 month. Unit-periods per year (w) = 24.
        Advance, 2-23-78. First payment, 3-1-78. Payments made
          on 1st and 16th of each month.
        From 2-23-78 through 3-1-78 = 6 days. (t = 0; f = 6/15)
        Annual percentage rate (I) = wi = 10.34 %

Example (J)(4): Quarterly payments (long first period)

        Amount advanced (A) = $10,000. Payment (P) = $385.
        Number of payments (n) = 40.
        Unit-period = 3 months. Unit-periods per year (w) = 4.
        Advance, 5-23-78. First payment, 10-1-78.
        From 7-1-78 through 10-1-78 = 1 unit-period. (t = 1)
        From 6-1-78 through 7-1-78 = 1 month = 30 days. From
          5-23-78 through 6-1-78 = 9 days. (f = 39/90)
        Annual percentage rate (I) = wi = 8.97 %

Example (J)(5): Weekly payments (long first period)

        Amount advanced (A) = $500. Payment (P) = $17.60.
        Number of payments (n) = 30.
        Unit-period = 1 week. Unit-periods per year (w) = 52.
        Advance, 3-20-78. First payment, 4-21-78.
        From 3-24-78 through 4-21-78 = 4 unit-periods. (t = 4)
        From 3-20-78 through 3-24-78 = 4 days. (f = 4/7)
        Annual percentage rate (I) = wi = 14.96 %

(K) Single advance transaction, with an odd first pay-
ment, with or without an odd first period, and otherwise regular.

The general equation in Section (H) can be put in the following

special form for this type of transaction:

$$A = \frac{1}{(1+fi)(1+i)^t} \left[P + \frac{P \ddot{a}_{\overline{n-1}}}{(1+i)} \right]$$

Example (K)(1): Monthly payments (regular first period and
irregular first payment)

Amount advanced (A) = $5000. First payment $\left(\begin{array}{c} P \\ 1 \end{array}\right)$ = $250.

Regular payment (P) = $230. Number of payments (n) = 24.
Unit-period = 1 month. Unit-periods per year (w) = 12
Advance, 1-10-78. First payment, 2-10-78.
From 1-10-78 through 2-10-78 = 1 unit-period. (t = 1; f = 0)
Annual percentage rate (I) = wi = 10.08 %

Example (K)(2): Payments every 4 weeks (long first period and irregular
first payment)

Amount advanced (A) = $400. First payment $\left(\begin{array}{c} P \\ 1 \end{array}\right)$ = $39.50

Regular payment (P) = $38.31. Number of payments (n) = 12.
Unit-period = 4 weeks. Unit-periods per year (w) = 52/4 = 13.
Advance, 3-18-78. First payment, 4-20-78.
From 3-23-78 through 4-20-78 = 1 unit-period. (t = 1)
From 3-18-78 through 3-23-78 = 5 days. (f = 5/28)
Annual percentage rate (I) = wi = 28.50%

(L) Single advance transaction, with an odd final payment, with

or without an odd first period, and otherwise regular. The general equa-

tion in Section (H) can be put in the following special form for this

type of transaction:

$$A = \frac{1}{(1+fi)(1+i)^t} \left[P\overset{..}{a}_{\overline{n-1}} + \frac{Pn}{(1+i)^{n-1}} \right]$$

Example (L)(1): Monthly payments (regular first period and irreg-
ular final payment).

Amount advanced (A) = $5000. Regular payment (P) = $230.
Final payment $\left(\begin{array}{c} P \\ n \end{array}\right)$ = $280. Number of payments (n) = 24.

Unit-period = 1 month. Unit-periods per year (w) = 12.
Advance, 1-10-78. First payment, 2-10-78.

From 1-10-78 through 2-10-78 = 1 unit-period. (t = 1; f = 0)
Annual percentage rate (I) = wi = 10.50%

Example (L)(2): Payments every 2 weeks (short first period and irregular final payment)

Amount advanced (A) = $200. Regular payment (P) = $9.50.
Final payment $\left(\dfrac{P}{n}\right)$ = $176.83. Number of payments (n) = 20.

Unit-period = 2 weeks. Unit-periods per year (w) = 52/2 = 26.
Advance, 4-3-78. First payment, 4-11-78.
From 4-3-78 through 4-11-78 = 8 days. (t = 0; f = 8/14).
Annual percentage rate (I) = wi = 12.22%

(M) Single advance transaction, with an odd first payment, odd final

payment, with or without an odd first period, and otherwise regular.

The general equation in Section (H) can be put in the following special

form for this type of transaction:

$$A = \frac{1}{(1+fi)(1+i)^t}\left[\frac{P}{1} + \frac{P\,\ddot{a}_{n-2}}{(1+i)} + \frac{P_n}{(1+i)^{n-1}}\right]$$

Example (M)(1): Monthly payments (regular first period, irregular first payment, and irregular final payment)

Amount advanced (A) = $5000. First payment $\left(\dfrac{P}{1}\right)$ = $250.

Regular payment (P) = $230. Final payment $\left(\dfrac{P}{n}\right)$ = $280.

Number of payments (n) = 24. Unit-period = 1 month.
Unit-periods per year (w) = 12.
Advance, 1-10-78. First payment, 2-10-78.
From 1-10-78 through 2-10-78 = 1 unit-period. (t = 1; f = 0)
Annual percentage rate (I) = wi = 10.90%

Example (M)(2): Payments every two months (short first period, irregular first payment, and irregular final payment)

Amount advanced (A) = $8000. First payment $\left(\dfrac{P}{1}\right)$ = $449.36.

Regular payment (P) = $465. Final payment $\left(\dfrac{P}{n}\right)$ = $200.

Number of payments (n) = 20. Unit-period = 2 months.
Unit-periods per year (w) = 12/2 = 6
Advance, 1-10-78. First payment, 3-1-78.
From 2-1-78 through 3-1-78 = 1 month. From 1-10-78
  through 2-1-78 = 22 days. (t = 0; f = 52/60)
Annual percentage rate (I) = wi = 7.30%

(N) Single advance, single payment transaction.

The general equation in Section (H) can be put in the special forms

below for single advance, single payment transactions. Forms 1 through

3 are for the direct determination of the annual percentage

special conditions. Form 4 requires the use of the iteration procedure

of Section (I) and can be used for all single advance, single payment

transactions regardless of term.

Form 1 - Term less than 1 year:

$$I = 100w \left(\frac{P}{A} - 1 \right)$$

Form 2 - Term more than 1 year but less than 2 years:

$$I = \frac{50}{f} \left\{ \left[(1 + f)^2 + 4f\left(\frac{P}{A} - 1\right) \right]^{1/2} - (1 + f) \right\}$$

Form 3 - Term equal to exactly a year or exact multiple of a year.

$$I = 100 \left[\left(\frac{P}{A}\right)^{1/t} - 1 \right]$$

Form 4 - Special form for iteration procedure (no restriction on term)

$$A = \frac{P}{(1 + fi)(1 + i)^t}$$

Example (N)(1): Single advance, single payment (term of less than
1 year, measured in days)

   Amount advanced (A) = $1000. Payment (P) = $1080.
   Unit-period = 255 days. Unit-period per year (w) = 365/255.
   Advance, 1-3-78. Payment, 9-15-78.
   From 1-3-78 through 9-15-78 = 255 days. (t = 0; f = 0)
   Annual percentage rate (I) = wi = 11.45%. (Use Form 1 or 4.)

Example (N)(2): Single advance, single payment (term of less than
1 year; measured in exact calendar months)

   Amount advanced (A) = $1000. Payment (P) = $1044.
   Unit-period = 6 months. Unit-periods per year (w) = 2.
   Advance, 7-15-78. Payment, 1-15-79.
   From 7-15-78 through 1-15-79 = 6 mos. (t = 1; f = 0)
   Annual percentage rate (I) = wi = 8.80%. (Use Form 1 or 4.)

Example (N)(3): Single advance, single payment (term of more than
   1 year but less than 2 years, fraction measured in exact months)

Amount advanced (A) = $1000. Payment (P) = $1135.19.
Unit-period = 1 year. Unit-periods per year (w) = 1.
Advance, 7-17-78. Payment, 1-17-80.
From 1-17-79 through 1-17-80 = 1 unit period. (t = 1)
From 7-17-78 through 1-17-79 = 6 mos. (f = 6/12)
Annual percentage rate (I) = wi = 8.76%. (Use Form 2 or 4.)

(O)   Complex single advance transaction.

Example (O)(1): Skipped payment loan (payments every 4 weeks)

A loan of $2135 is advanced on 1-25-78. It is to be repaid
by 24 payments of $100 each. Payments are due every 4 weeks
beginning 2-20-78. However, in those months in which 2 pay-
ments would be due, only the first of the two payments is made
and the following payment is delayed by 2 weeks to place it in
the next month.
Unit-period = 4 weeks. Unit periods per year (w) = 52/4 = 13.
From 1-25-78 through 2-20-78 = 26 days. ($t_1 = 0$; $f_1 = 26/28$)

Second series of payments begins 9 unit-periods plus 2 weeks
   after 2-20-78. ($t_2 = 10$; $f_2 = 12/28$)

Third series of payments begins 6 unit-periods plus 2 weeks after
   start of second series. ($t_3 = 16$; $f_3 = 26/28$)

Last series of payments begins 6 unit-periods plus 2 weeks after
   start of third series. ($t_4 = 23$; $f_4 = 12/28$)

The general equation of Section H can be written in the
   special form:

$$2135 = \frac{100\,\ddot{a}_{\overline{9}|}}{(1+(26/28)i} + \frac{100\,\ddot{a}_{\overline{6}|}}{(1+(12/28)i)(1+i)^{10}}$$

$$+ \frac{100\,\ddot{a}_{\overline{6}|}}{(1+(26/28)i)(1+i)^{16}} + \frac{100\,\ddot{a}_{\overline{3}|}}{(1+(12/28)i)(1+i)^{23}}$$

Annual percentage rate (I) = wi = 12.00%

Example (O)(2): Skipped payment loan plus single payments

A loan of $7350 on 3-3-78 is to be repaid by three monthly
payments of $1000 each beginning 9-15-78, plus a single payment
of $2000 on 3-15-79, plus 3 more monthly payments of $750 each
beginning 9-15-79, plus a final payment of $1000 on 2-1-80.

Unit-period = 3 months. Unit-periods per year (w) = 12/3 = 4.
From 3-3-78 through 9-15-78 = (12+180) days. $(t_1 = 2, f_1 = 12/90)$

"	"	"	10-15-78 = (12+210) "	$(t_2 = 2, f_2 = 42/90)$
"	"	"	1-15-78 = (12+240) "	$(t_3 = 2, f_3 = 72/90)$
"	"	"	3-15-79 = (12+360) "	$(t_4 = 4, f_4 = 12/90)$
"	"	"	9-15-79 = (12+540) "	$(t_5 = 6, f_5 = 12/90)$
"	"	"	10-15-79 = (12+570) "	$(t_6 = 6, f_6 = 42/90)$
"	"	"	11-15-79 = (12+600) "	$(t_7 = 6, f_7 = 72/90)$
"	"	"	2-1-80 = (29+660) "	$(t_8 = 7, f_8 = 59/90)$

The general equation in Section (H) can be written in the special
form:

$$8014 = \frac{1000}{(1+i)^2}\left\{\frac{1}{(1+(12/90)i)} + \frac{1}{(1+(42/90)i)} + \frac{1}{1+(72/90)i}\right\}$$

$$+ \frac{2000}{(1+(12/90)i)(1+i)^4} + \frac{750}{(1+i)^6}\left\{\frac{1}{(1+(12/90)i)} + \frac{1}{(1+(42/90)i)}\right.$$

$$\left. + \frac{1}{(1+(72/90)i)}\right\} + \frac{1000}{(1+(59/90)i)(1+i)^7}$$

Annual percentage rate (I) = wi = 10.30%

Example (O)(3): Graduated payment mortgage

A loan of $39,688.56 (net) on 4-10-78 is to be repaid by 360 monthly payments beginning 6-1-78. Payments are the same for 12 months at a time as follows:

Year	Monthly payment	Year	Monthly payment	Year	Monthly payment
1	$291.81	11	$385.76	21	$380.43
2	300.18	12	385.42	22	379.60
3	308.78	13	385.03	23	378.68
4	317.61	14	384.62	24	377.69
5	326.65	15	384.17	25	376.60
6	335.92	16	383.67	26	375.42
7	345.42	17	383.13	27	374.13
8	355.15	18	382.54	28	372.72
9	365.12	19	381.90	29	371.18
10	375.33	20	381.20	30	369.50

Unit-period = 1 month. Unit-periods per year (w) = 12.
From 5-1-78 through 6-1-78 = 1 unit-period. (t = 1)
From 4-10-78 through 5-1-78 = 21 days. (f = 21/30)

The general equation in Section (H) can be written in the special form:

$$39{,}688.56 = \frac{a\ddot{}_{\overline{12}|}}{(1+(21/30)i)(1+i)}\left[291.81 + \frac{300.18}{(1+i)^{12}} + \frac{308.78}{(1+i)^{24}} + \ldots \ldots + \frac{369.50}{(1+i)^{348}}\right]$$

Annual percentage rate (I) = wi = 9.80%

(P) Multiple advance transactions.

Example (P)(1): Construction loan

Three advances of $20,000 each are made on 4-10-79, 6-12-79, and 9-18-79. Repayment is by 240 monthly payments of $612.36 each beginning 12-10-79.

Unit-period = 1 month. Unit-periods per year (w) = 12.
From 4-10-79 through 6-12-79 = (2+2/30) unit-periods.
From 4-10-79 through 9-18-79 = (5+8/30) unit-periods.
From 4-10-79 through 12-10-79 = (8) unit-periods.

The general equation in Section (H) is changed to the single advance mode by treating the 2nd and 3rd advances as negative payments:

$$20,000 = \frac{612.36 \; a\overline{\;240\;}}{(1+i)^8} - \frac{20,000}{(1+(2/30)i)(1+i)^2} - \frac{20,000}{(1+(8/30)i)(1+i)^5}$$

Annual percentage rate (I) = wi = 10.25%

Example (P)(2): Student loan

A student loan consists of 8 advances: $1800 on 9-5-78, 9-5-79, 9-5-80, and 9-5-81; plus $1000 on 1-5-79, 1-5-80, 1-5-81, and 1-5-82. The borrower is to make 50 monthly payments of $240 each beginning 7-1-78 (prior to first advance).

Unit-period = 1 month. Unit-periods per year (w) = 12.

Zero point is date of first payment since it precedes first advance.

From 7-1-78 to 9-5-78 = (2 + 4/30) unit-periods.

  "   "   "   9-5-79 = (14 + 4/30)   "

  "   "   "   9-5-80 = (26 + 4/30)   "

  "   "   "   9-5-81 = (38 + 4/30)   "

  "   "   "   1-5-79 = (6 + 4/30)   "

  "   "   "   1-5-80 = (18 + 4/30)   "

  "   "   "   1-5-81 = (30 + 4/30)   "

  "   "   "   1-5-82 = (42 = 4/30)   "

Since the zero point is date of first payment, the general equation
in Section (H) is written in the single advance form below by treating
the first payment as a negative advance and the 8 advances as nega-
tive payments:

$$- 240 = \frac{240 \ddot{a}\overline{49|}}{(1+i)} - \frac{1800}{1+(4/30)i} \left[\frac{1}{(1+i)^2} \right.$$

$$+ \frac{1}{(1+i)^{14}} + \frac{1}{(1+i)^{26}} + \left. \frac{1}{(1+i)^{38}} \right]$$

$$- \frac{1000}{1+(4/30)i} \left[\frac{1}{(1+i)^6} + \frac{1}{(1+i)^{18}} + \frac{1}{(1+i)^{30}} + \frac{1}{(1+i)^{42}} \right]$$

Annual percentage rate (I) = wi = 32.04%

(Q) Transaction involving required deposit balance.

Example (Q)(1): Required constant deposit balance.

Creditor advances $1000 on 4-12-79 and requires borrower to maintain
a deposit balance of $200 throughout the 12 month loan. The loan is
to be repaid by 12 equal monthly payments of $90 each beginning
5-12-79. The deposit balance will be released on 4-12-80.

Unit-period = 1 month. Unit-periods per year (w) = 12.
From 4-12-79 through 5-12-79 = 1 unit-period.
From 4-12-79 through 4-12-80 = 12 unit-periods.

The general equation in Section (H) can be written as:

$$800 + \frac{200}{(1+i)^{12}} = \frac{90 \ddot{a}\overline{12|}}{(1+i)}$$

or for iteration solution as:

$$800 = \frac{90 \ddot{a}\overline{12|}}{(1+i)} - \frac{200}{(1+i)^{12}}$$

Annual percentage rate (I) = wi = 22.23%

Example (Q)(2): Required periodic deposits into a restricted account

Creditor advances $1000 on 6-15-79. Borrower is required to make 12 monthly payments of $110 each beginning 7-15-79, of which $20 is to be deposited into an account. The account will be released to the borrower at time of final payment on 6-15-80.

Unit-period = 1 month. Unit-periods per year (w) = 12.
From 6-15-79 through 7-15-79 = 1 unit-period.

The general equation in Section (H) can be written as:

$$1000 + \frac{240}{\frac{12}{(1+i)}} = \frac{110\ \ddot{a}_{\overline{12}|}}{(1+i)}$$

or for iteration solution as:

$$1000 = \frac{110\ \ddot{a}_{\overline{12}|}}{(1+i)} - \frac{240}{\frac{12}{(1+i)}}$$

Annual percentage rate (I) = wi = 17.79%

III. UNITED STATES RULE METHOD

(A) General rule. The annual percentage rate shall be the nominal annual percentage rate determined by multiplying the daily rate by 365, the number of days in a year.

(B) Term of the transaction. The term of the transaction begins on the date of its consummation, except that if the finance charge or any portion of it is earned beginning on some other date, the term begins on that other date. The term ends on the date the last payment is due, except that if an advance is scheduled after that date, the term ends on the later date. For computation purposes, the length of the term shall be equal to the time interval between any point in time on the beginning date to the same point in time on the ending date.

(C) <u>Symbols.</u> The symbols used to express the terms of a transaction in the equation set forth in Section (D) are defined as follows:

A_k = The amount of the kth advance.

g_j = The number of days in the jth payment period.

h_k = The number of days from date of the kth advance to date of next payment.

n = The number of payments.

i = The percentage rate of finance charge per day.

I = 365i = The nominal annual percentage rate.

(D) <u>General equation.</u> The following equation sets forth the relationship among the terms of a transaction:

$$A_1 = \frac{P_1}{(1+g_1 i)} + \frac{P_2}{(1+g_1 i)(1+g_2 i)} + \frac{P_3}{(1+g_1 i)(1+g_2 i)(1+g_3 i)} +$$

$$\cdots\cdots + \frac{P_n}{(1+g_1 i)(1+g_2 i)\cdots\cdots(1+g_n i)}$$

If there are multiple advances, and the kth advance occurs in the jth payment period, the jth term on the right hand side of the equation can take the form:

$$\frac{P_j - A_k(1+h_k i)}{(1+g_1 i)(1+g_2 i)\cdots\cdots(1+g_j i)}$$

Alternatively, the kth advance can be shown on the left-hand side of the equation as follows:

$$\frac{A_k(1+h_k i)}{(1+g_1 i)(1+g_2 i)\cdots(1+g_j i)}$$

(E) <u>Single advance transaction with equal payments.</u>   A loan of $500.16 is made on 1-15-79. Six monthly payments of $86.27 each are due on 2-15-79, 3-15-79, etc. through 6-15-79.

The general equation takes the form:

$$\$500.16 = \frac{\$86.27}{(1+31i)} + \frac{\$86.27}{(1+31i)(1+28i)} + \ldots$$

$$\ldots + \frac{\$86.27}{(1+31i)(1+28i)(1+31i)(1+30i)(1+31i)(1+30i)}$$

Using an iteration process of the type shown in Section II(I), the annual percentage rate, I, is found to be 12.00%.

[Note: If the above transaction had run from 7-15-79 through 1-15-80, the APR would have been 11.76%.]

(F) <u>Single advance transaction with long first period and large final payment.</u> A real estate loan for $50,000 is made on 1-15-79. Four monthly payments of $438.56 are made on 3-15-79, 4-15-79, 5-15-79, and 6-15-79 plus a balloon payment of $50,733.59 on 7-15-79.

Because the first payment is not sufficient to pay the accrued finance charge on the $50,000 balance, it is combined with the second payment and the equation takes the form:

$$\$50,000 = \frac{\$877.12}{(1+90i)} + \frac{\$438.56}{(1+90i)(1+30i)} + \frac{\$438.56}{(1+90i)(1+30i)(1+31i)}$$

$$+ \frac{\$50,733.59}{(1+90i)(1+30i)(1+31i)(1+30i)}$$

Using an iteration process of the type shown in Section II(I), the annual percentage rate, I, is found to be 10.00%.

(G) <u>Multiple advance transaction with long first period and large final payment.</u> The first advance of a real estate loan is made in the amount of $25,000 on 1-15-79. A second advance of $25,000 is made on 4-1-79. Four

payments of $438.72 each are made monthly on 3-15-79 through 6-15-79, followed by a balloon of $50,198.98 on 7-15-79.

Since the second advance occurs in the second payment period, it is combined with the second payment and the equation takes the form:

$$\$25,000 = \frac{\$438.72}{(1+59i)} + \frac{\$438.72 - \$25,000(1+14i)}{(1+59i)(1+31i)}$$

$$+ \frac{\$438.72}{(1+59i)(1+31i)(1+30i)} + \frac{\$438.72}{(1+59i)(1+31i)(1+30i)(1+31i)}$$

$$+ \frac{\$50,198.98}{(1+59i)(1+31i)(1+30i)(1+31i)(1+30i)}$$

Using an iteration process of the type shown in Section II(I), the annual percentage rate, I, is found to be 10.00%.

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VOLUME I OF BOARD'S APR TABLES

APPENDIX

FINDING THE ANNUAL PERCENTAGE RATE FOR CERTAIN IRREGULAR TRANSACTIONS

This appendix provides a method of determining the annual percentage rate for certain irregular transactions. It can be used for single advance transactions in which all payment periods and payment amounts are equal except for one or more of the following irregularities:

A first payment period that is shorter than the regular period or is no more than 3 times longer than the regular period.

A first payment amount that is smaller than the regular payment or is no more than 3 times larger than the regular payment.

A final payment amount that is smaller than the regular payment or is no more than 20 times larger than the regular payment.

[Long days (+) or short days (-)] X [Factor from Factor Table] =

<div align="right">Adjustment to
number of payments</div>

To get the factor from the Factor Table, find the payment line in
the left-hand column which is equal to the number of payments in
the transaction (or to the nearest whole number to the adjusted
number of payments if Step 2 was used). Then select a rate from
the top row of the Factor Table which is closest to the estimated
rate. [2]

Note that it may be necessary to repeat Steps 3 and 4 if the appropriate
rate column is not selected the first time. (See Step 5 below.)

Step 4 - Adjust the finance charge per $100 of amount financed (FC/100)

If the number of payments was adjusted in Step 2 or 3, determine the
adjusted finance charge per $100 of the amount financed in the following
formula:

$$FC/100 \ X \ \frac{\text{(Adjusted no. of pmts. rounded to nearest whole number)}}{\text{(Adjusted number of payments)}} =$$

<div align="right">Adjusted FC/100</div>

If the adjusted number of payments (unrounded) is less than 12, however,
use the following formula:

$$FC/100 \ X \ \frac{\text{(Adjusted no. of pmts. rounded to nearest whole number)} + 1}{\text{(Adjusted number of payments)} + 1} =$$

<div align="right">Adjusted FC/100</div>

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[2] If a better basis is not available for estimating the rate, use the APR
from the rate tables which corresponds to the number of payments (ad-
justed by Step 2 when applicable) and the FC/100 from Step 1.

Step 5 - Find APR from rate tables

Determine the APR from the rate tables using the adjusted number of payments rounded to the nearest whole number and the adjusted FC/100. If the APR so determined varies from the Factor Table rate column selected in Step 3 by more than 5 percentage points, Steps 3 and 4 must be repeated using the rate column closest to the rate initially determined.

EXAMPLE 1 - ODD FIRST PERIOD

Amount Financed	$1000
Finance Charge	118.64
First Period	1 month and 20 days
24 payments of $46.61 each	

Step 1 - Adjust for large first payment and compute FC/100

Adjustment for large first payment not applicable

$$FC/100 = \frac{118.64 \times 100}{1000} = 11.86$$

Step 2 - Adjust for odd final payment and/or small first payment

Not applicable

Step 3 - Adjust for odd first period

In the Factor Table, select the rate column closest to the estimated rate [3/] and find the factor .0690 on the 24 payment line.

No. of odd days x Factor from Factor Table = Adjustment to no. of pmts.

+ 20	x	.0690	= 1.38
			+24.00
		Adjusted no. of pmts. =	25.38

3/An estimated rate of 11% can be determined from the rate tables by using a FC/100 of 11.86 and 24 payments; the nearest column on the Factor Table is 10%.

Step 4 - Adjust the FC/100

$$11.86 \text{ x } \frac{25}{25.38} = 11.68 = \text{Adjusted FC/100}$$

Step 5 - Find APR from rate tables

Using 25 payments and a FC/100 of 11.68, APR = <u>10.50%</u>

<u>EXAMPLE 2 - ODD FIRST PERIOD AND LARGE FIRST PAYMENT</u>

Amount Financed	$1000
Finance Charge	100
First Period	20 days

24 Payments:

First	$65
Regular	45

Step 1 - Adjust for large first payment and compute FC/100

1000 - (65-45) = 980 = Adjusted amount financed

$$FC/100 = \frac{100 \text{ x } 100}{980} = 10.20$$

Step 2 - Adjust for odd final payment and/or small first payment

Not applicable

Step 3 - Adjust for odd first period

In the Factor Table, select the rate column closest to the estimated rate [4] and find the factor .0690 on the 24 payment line.

No. of odd days x Factor from Factor Table = Adjustment to no. of pmts.

- 10	x	.0690	=	-.69

$$\begin{array}{r} +24.00 \\ \hline \text{Adjusted no. of pmts.} = 23.31 \end{array}$$

[4] An estimated rate of 9.50% can be determined from the rate tables by using a FC/100 of 10.20 and 24 payments. The nearest column on the Factor Table is 10%.

Step 4 - Adjust the FC/100

$$10.20 \times \frac{23}{23.31} = 10.06 = \text{Adjusted FC/100}$$

Step 5 - Find APR from rate tables

Using 23 payments and a FC/100 of 10.06, the APR = 9.75%

EXAMPLE 3 - ODD FIRST PERIOD, LARGE FIRST PAYMENT AND LARGE FINAL PAYMENT

Amount Financed	$5000
Finance Charge	1698.85
First Period	1 month and 20 days

30 Payments:

First	$ 394.05
Regular	131.35
Final	2627.00

Step 1 - Adjust for large first payment and compute FC/100

$$5000 - (394.05 - 131.35) = 4737.30 = \text{Adjusted amount financed}$$

$$\text{FC/100} = \frac{1698.85 \times 100}{4737.30} = 35.86$$

Step 2 - Adjust for odd final payment

$$\frac{(2627 - 131.35) \times 29}{(4737.30 + 1698.85)} = \text{Adjustment to no. of pmts.}$$

$$\frac{2494.65 \times 29}{2136.15} = 11.24$$

$$\frac{+ 30.00}{41.24} = \text{Adjusted no. of pmts.}$$

Step 3 - Adjust for odd first period

In the Factor Table, select the rate column closest to the estimated
rate [5] and find the factor .0729 on the 41 payment line.

No. of odd days x Factor from Factor Table = Adjustment to no.
of pmts.

+ 20   x   .0752   =   1.50

No. of pmts. from Step 2 = +41.24
Adjusted no. of pmts. = 42.74

Step 4 - Adjust the FC/100

$$35.86 \times \frac{43}{42.74} = 36.08 = \text{Adjusted FC/100}$$

Step 5 - Find APR from rate tables

Using 43 payments and a FC/100 of 36.08, APR = 17.75%

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[5] An estimated rate of 18.50% can be determined from the rate tables by using
a FC/100 of 35.86 and 41 payments. The nearest column on the Factor Table
is 20%.

FACTOR TABLE
Odd First Period Adjustment Factors

No. of pmts.	0%	5%	10%	15%	20%	25%	30%	35%	40%	45%	50%	55%	60%
2	.0667	.0668	.0669	.0670	.0671	.0672	.0674	.0675	.0676	.0677	.0678	.0679	.0680
3	.0667	.0668	.0670	.0672	.0673	.0675	.0676	.0678	.0680	.0681	.0683	.0685	.0686
4	.0667	.0669	.0671	.0673	.0675	.0677	.0679	.0681	.0683	.0686	.0688	.0690	.0692
5	.0667	.0669	.0672	.0674	.0677	.0680	.0682	.0685	.0687	.0690	.0693	.0695	.0698
6	.0667	.0670	.0673	.0676	.0679	.0682	.0685	.0688	.0691	.0694	.0697	.0701	.0704
7	.0667	.0670	.0674	.0677	.0681	.0684	.0688	.0691	.0695	.0699	.0702	.0706	.0710
8	.0667	.0671	.0675	.0679	.0683	.0687	.0691	.0695	.0699	.0703	.0708	.0712	.0716
9	.0667	.0671	.0676	.0680	.0685	.0689	.0694	.0698	.0703	.0708	.0713	.0717	.0722
10	.0667	.0672	.0676	.0681	.0687	.0692	.0697	.0702	.0707	.0712	.0718	.0723	.0729
11	.0667	.0672	.0677	.0683	.0688	.0694	.0700	.0705	.0711	.0717	.0723	.0729	.0735
12	.0667	.0672	.0678	.0684	.0690	.0697	.0703	.0709	.0715	.0722	.0728	.0735	.0742
13	.0667	.0673	.0679	.0686	.0692	.0699	.0706	.0713	.0720	.0727	.0734	.0741	.0748
14	.0667	.0673	.0680	.0687	.0694	.0702	.0709	.0716	.0724	.0731	.0739	.0747	.0755
15	.0667	.0674	.0681	.0689	.0696	.0704	.0712	.0720	.0728	.0736	.0745	.0753	.0762
16	.0667	.0674	.0682	.0690	.0698	.0707	.0715	.0724	.0732	.0741	.0750	.0759	.0769
17	.0667	.0675	.0683	.0692	.0700	.0709	.0718	.0727	.0737	.0746	.0756	.0766	.0776
18	.0667	.0675	.0684	.0693	.0702	.0712	.0721	.0731	.0741	.0751	.0762	.0772	.0783
19	.0667	.0676	.0685	.0695	.0704	.0714	.0725	.0735	.0746	.0756	.0767	.0779	.0790
20	.0667	.0676	.0686	.0696	.0706	.0717	.0728	.0739	.0750	.0762	.0773	.0785	.0797
21	.0667	.0677	.0687	.0698	.0709	.0720	.0731	.0743	.0755	.0767	.0779	.0792	.0805
22	.0667	.0677	.0688	.0699	.0711	.0722	.0734	.0747	.0759	.0772	.0785	.0799	.0812
23	.0667	.0678	.0689	.0701	.0713	.0725	.0738	.0751	.0764	.0777	.0791	.0806	.0820
24	.0667	.0678	.0690	.0702	.0715	.0728	.0741	.0755	.0768	.0783	.0797	.0812	.0828
25	.0667	.0679	.0691	.0704	.0717	.0730	.0744	.0759	.0773	.0788	.0804	.0819	.0836
26	.0667	.0679	.0692	.0705	.0719	.0733	.0748	.0763	.0778	.0794	.0810	.0827	.0844
27	.0667	.0680	.0693	.0707	.0721	.0736	.0751	.0767	.0783	.0799	.0816	.0834	.0852
28	.0667	.0680	.0694	.0708	.0723	.0739	.0754	.0771	.0788	.0805	.0823	.0841	.0860
29	.0667	.0681	.0695	.0710	.0725	.0741	.0758	.0775	.0792	.0811	.0829	.0848	.0868
30	.0667	.0681	.0696	.0711	.0728	.0744	.0761	.0779	.0797	.0816	.0836	.0856	.0876

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No. of pmts.	0%	5%	10%	15%	20%	25%	30%	35%	40%	45%	50%	55%	60%
31	.0667	.0682	.0697	.0713	.0730	.0747	.0765	.0783	.0802	.0822	.0842	.0863	.0885
32	.0667	.0682	.0698	.0715	.0732	.0750	.0768	.0788	.0807	.0828	.0849	.0871	.0893
33	.0667	.0683	.0699	.0716	.0734	.0753	.0772	.0792	.0813	.0834	.0856	.0879	.0902
34	.0667	.0683	.0700	.0718	.0736	.0755	.0775	.0796	.0818	.0840	.0863	.0886	.0911
35	.0667	.0683	.0701	.0719	.0738	.0758	.0779	.0801	.0823	.0846	.0870	.0894	.0920
36	.0667	.0684	.0702	.0721	.0741	.0761	.0783	.0805	.0828	.0852	.0877	.0902	.0929
37	.0667	.0684	.0703	.0723	.0743	.0764	.0786	.0809	.0833	.0858	.0884	.0910	.0938
38	.0667	.0685	.0704	.0724	.0745	.0767	.0790	.0814	.0839	.0864	.0891	.0919	.0947
39	.0667	.0685	.0705	.0726	.0747	.0770	.0794	.0818	.0844	.0871	.0898	.0927	.0956
40	.0667	.0686	.0706	.0727	.0750	.0773	.0797	.0823	.0849	.0877	.0906	.0935	.0966
41	.0667	.0686	.0707	.0729	.0752	.0776	.0801	.0827	.0855	.0883	.0913	.0944	.0975
42	.0667	.0687	.0708	.0731	.0754	.0779	.0805	.0832	.0860	.0890	.0920	.0952	.0985
43	.0667	.0687	.0709	.0732	.0757	.0782	.0809	.0837	.0866	.0896	.0928	.0961	.0995
44	.0667	.0688	.0710	.0734	.0759	.0785	.0813	.0841	.0871	.0903	.0935	.0969	.1004
45	.0667	.0688	.0711	.0736	.0761	.0788	.0816	.0846	.0877	.0909	.0943	.0978	.1014
46	.0667	.0689	.0712	.0737	.0764	.0791	.0820	.0851	.0883	.0916	.0951	.0987	.1024
47	.0667	.0689	.0713	.0739	.0766	.0794	.0824	.0856	.0888	.0923	.0959	.0996	.1035
48	.0667	.0690	.0714	.0741	.0768	.0797	.0828	.0860	.0894	.0930	.0967	.1005	.1045
49	.0667	.0690	.0716	.0742	.0771	.0801	.0832	.0865	.0900	.0937	.0974	.1014	.1055
50	.0667	.0691	.0717	.0744	.0773	.0804	.0836	.0870	.0906	.0943	.0983	.1023	.1065
51	.0667	.0691	.0718	.0746	.0775	.0807	.0840	.0875	.0912	.0950	.0991	.1033	.1076
52	.0667	.0692	.0719	.0747	.0778	.0810	.0844	.0880	.0918	.0957	.0999	.1042	.1087
53	.0667	.0692	.0720	.0749	.0780	.0813	.0848	.0885	.0924	.0965	.1007	.1051	.1097
54	.0667	.0693	.0721	.0751	.0783	.0816	.0852	.0890	.0930	.0972	.1015	.1061	.1108
55	.0667	.0693	.0722	.0752	.0785	.0820	.0856	.0895	.0936	.0979	.1024	.1071	.1119
56	.0667	.0694	.0723	.0754	.0787	.0823	.0861	.0900	.0942	.0986	.1032	.1080	.1130
57	.0667	.0694	.0724	.0756	.0790	.0826	.0865	.0905	.0948	.0994	.1041	.1090	.1141
58	.0667	.0695	.0725	.0758	.0792	.0830	.0869	.0911	.0955	.1001	.1049	.1100	.1152
59	.0667	.0695	.0726	.0759	.0795	.0833	.0873	.0916	.0961	.1008	.1058	.1110	.1164
60	.0667	.0696	.0727	.0761	.0797	.0836	.0877	.0921	.0967	.1016	.1067	.1120	.1175

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No of pmts.	0%	5%	10%	15%	20%	25%	30%	35%	40%
61	.0667	.0696	.0728	.0763	.0800	.0840	.0882	.0926	.0974
62	.0667	.0697	.0729	.0765	.0802	.0843	.0886	.0932	.0980
63	.0667	.0697	.0731	.0766	.0805	.0846	.0890	.0937	.0987
64	.0667	.0698	.0732	.0768	.0808	.0850	.0895	.0943	.0993
65	.0667	.0698	.0733	.0770	.0810	.0853	.0899	.0948	.1000
66	.0667	.0699	.0734	.0772	.0813	.0857	.0903	.0953	.1006
67	.0667	.0699	.0735	.0774	.0815	.0860	.0908	.0959	.1013
68	.0667	.0700	.0736	.0775	.0818	.0863	.0912	.0964	.1020
69	.0667	.0700	.0737	.0777	.0820	.0867	.0917	.0970	.1026
70	.0667	.0701	.0738	.0779	.0823	.0870	.0921	.0976	.1033
71	.0667	.0701	.0739	.0781	.0826	.0874	.0926	.0981	.1040
72	.0667	.0702	.0740	.0783	.0828	.0878	.0931	.0987	.1047
73	.0667	.0702	.0742	.0784	.0831	.0881	.0935	.0993	.1054
74	.0667	.0703	.0743	.0786	.0834	.0885	.0940	.0999	.1061
75	.0667	.0703	.0744	.0788	.0836	.0888	.0944	.1004	.1068
76	.0667	.0704	.0745	.0790	.0839	.0892	.0949	.1010	.1075
77	.0667	.0704	.0746	.0792	.0842	.0896	.0954	.1016	.1082
78	.0667	.0705	.0747	.0794	.0844	.0899	.0959	.1022	.1089
79	.0667	.0705	.0748	.0796	.0847	.0903	.0963	.1028	.1097
80	.0667	.0706	.0750	.0797	.0850	.0907	.0968	.1034	.1104
81	.0667	.0706	.0751	.0799	.0853	.0910	.0973	.1040	.1111
82	.0667	.0707	.0752	.0801	.0855	.0914	.0978	.1046	.1119
83	.0667	.0708	.0753	.0803	.0858	.0918	.0983	.1052	.1126
84	.0667	.0708	.0754	.0805	.0861	.0922	.0987	.1058	.1133
85	.0667	.0709	.0755	.0807	.0864	.0925	.0992	.1064	.1141
86	.0667	.0709	.0756	.0809	.0866	.0929	.0997	.1070	.1148
87	.0667	.0710	.0758	.0811	.0869	.0933	.1002	.1077	.1156
88	.0667	.0710	.0759	.0813	.0872	.0937	.1007	.1083	.1163
89	.0667	.0711	.0760	.0815	.0875	.0941	.1012	.1089	.1171
90	.0667	.0711	.0761	.0817	.0878	.0945	.1017	.1096	.1179

No. of pmts.	0%	5%	10%	15%	20%	25%	30%	35%	40%
91	.0667	.0712	.0762	.0818	.0881	.0949	.1022	.1102	.1187
92	.0667	.0712	.0763	.0820	.0883	.0953	.1028	.1108	.1194
93	.0667	.0713	.0765	.0822	.0886	.0957	.1033	.1115	.1202
94	.0667	.0713	.0766	.0824	.0889	.0960	.1038	.1121	.1210
95	.0667	.0714	.0767	.0826	.0892	.0964	.1043	.1128	.1218
96	.0667	.0714	.0768	.0828	.0895	.0968	.1048	.1134	.1226
97	.0667	.0715	.0769	.0830	.0898	.0972	.1053	.1141	.1234
98	.0667	.0715	.0770	.0832	.0901	.0977	.1059	.1147	.1242
99	.0667	.0716	.0772	.0834	.0904	.0981	.1064	.1154	.1250
100	.0667	.0716	.0773	.0836	.0907	.0985	.1069	.1161	.1258
101	.0667	.0717	.0774	.0838	.0910	.0989	.1075	.1167	.1266
102	.0667	.0717	.0775	.0840	.0913	.0993	.1080	.1174	.1274
103	.0667	.0718	.0776	.0842	.0916	.0997	.1085	.1181	.1282
104	.0667	.0719	.0778	.0844	.0919	.1001	.1091	.1188	.1291
105	.0667	.0719	.0779	.0846	.0922	.1005	.1096	.1194	.1299
106	.0667	.0720	.0780	.0849	.0925	.1009	.1102	.1201	.1307
107	.0667	.0720	.0781	.0851	.0928	.1014	.1107	.1208	.1316
108	.0667	.0721	.0783	.0853	.0931	.1018	.1113	.1215	.1324
109	.0667	.0721	.0784	.0855	.0934	.1022	.1118	.1222	.1333
110	.0667	.0722	.0785	.0857	.0937	.1026	.1124	.1229	.1341
111	.0667	.0722	.0786	.0859	.0940	.1031	.1129	.1236	.1350
112	.0667	.0723	.0787	.0861	.0944	.1035	.1135	.1243	.1358
113	.0667	.0723	.0789	.0863	.0947	.1039	.1141	.1250	.1367
114	.0667	.0724	.0790	.0865	.0950	.1044	.1146	.1257	.1375
115	.0667	.0724	.0791	.0867	.0953	.1048	.1152	.1264	.1384
116	.0667	.0725	.0792	.0869	.0956	.1052	.1158	.1271	.1393
117	.0667	.0726	.0794	.0872	.0959	.1057	.1163	.1279	.1401
118	.0667	.0726	.0795	.0874	.0962	.1061	.1169	.1286	.1410
119	.0667	.0727	.0796	.0876	.0966	.1066	.1175	.1293	.1419
120	.0667	.0727	.0797	.0878	.0969	.1070	.1181	.1300	.1428

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To aid in the consideration of these matters by the Board, interested persons are invited to submit relevant data, views, comments or arguments. Any such material should be submitted in writing to the Secretary, Board of Governors of the Federal Reserve System, Washington, D. C. 20551, to be received not later than October 15, 1979, and should include the docket number R-0239. The material submitted will be made available for public inspection and copying, except as provided in § 261.6(a) of the Board's Rules Regarding Availability of Information (12 CFR 261.6(a)).

By order of the Board of Governors, July 24, 1979.

Theodore E. Allison
Secretary of the Board