November 22, 2021

RE: NOTICE OF FOURTH MODIFICATIONS TO PROPOSED REGULATIONS UNDER DIVISION 9.5 OF THE CALIFORNIA FINANCIAL CODE PRO 01/18

Commissioner of Financial Protection and Innovation
Attn: Sandra Sandoval, Regulations Coordinator
300 South Spring Street, 15th Floor
Los Angeles, CA 90013
Attention: Charlie Carriere and Jesse Mattson
Via electronic mail: regulations@dfpi.ca.gov, [redacted]@dfpi.ca.gov, [redacted]@dfpi.ca.gov

Dear Mr. Carriere and Mr. Mattson:

The Responsible Business Lending Coalition (RBLC), the California Association for Micro Enterprise Opportunity (CAMEO), and the Consumer Federation of California (CFC) thank the California Department of Financial Protection and Innovation (DFPI) for publishing the fourth modifications to commercial disclosure regulations implementing Senate Bill 1235.[1] We thank DFPI for this critical step towards the final rule. As California's hard-working entrepreneurs begin to emerge from the shadows of the COVID-19 crisis, they are seeking financing to adapt their products and services, hire employees, and expand their businesses. Business owners need clear information about rates and terms to avoid unaffordable debt and select the best product for their financing needs. Therefore, **we ask DFPI to finalize and implement the regulations as soon as possible.**

In October 2021, we submitted a comment letter in response to DFPI's third modifications to its commercial financing disclosure regulations. We were pleased to see that DFPI incorporated most of our recommendations in the fourth modifications, published October 5, 2021.

We recommended that DFPI remove state-specific language so that California can continue guiding the nation in pursuit of a more transparent commercial financing marketplace. DFPI wisely replaced "California Law" with "Applicable law" in §901 General Requirements, enabling DFPI-compliant disclosures to be used in other states. We thank DFPI for leading the nation with strong disclosure standards and for promoting interstate harmonization.

In addition, we asked DFPI to extend the compliance date to six months from the effective date of the regulation. We are grateful that DFPI granted this extension in the fourth modifications. Additional time will allow lenders to properly come into compliance. This change also aligns with New York's draft regulations, which include a six-month extension.

[1] State of California Department of Financial Protection and Innovation, "CALIFORNIA CODE OF REGULATIONS TITLE 10, CHAPTER 3 Third Modifications," Oct. 12, 2021. https://dfpi.ca.gov/wp-content/uploads/sites/337/2021/10/2021-10-12-SB-1235- Regulations-For-Publication.pdf

Lastly, we proposed that DFPI require annual data collection for providers that use the opt-in method for calculating estimated annualized percentage rates (APR). DFPI did not include this recommendation in the fourth modification, but still has the opportunity to mandate APR reporting under the Financial Code Section 90009(e) small business data collection rulemaking. We encourage DFPI to collect APR data through either avenue, to ensure that providers do not disclose unreasonably low APRs and also to maintain consistency between California and New York, where APR reporting is required by statute.

In support of DFPI's finalization of the rule, and to aid financing providers preparing to comply, we have included an appendix on APR calculation. We believe it helps demonstrate several ways financing providers can calculate APRs compliance with these regulations for all required products with relative ease, using common software such as Microsoft Excel.

The RBLC, CAMEO, and CFC applaud DFPI for its diligent work to bring much-needed sunshine to the commercial financing marketplace and enable California small business owners to make informed financing decisions. We appreciate DFPI's thoughtful revisions and urge DFPI to publish a final rule as soon as possible.

Sincerely,

The Responsible Business Lending Coalition

Coalition California Association for Micro Enterprise Opportunity

Consumer Federation of California

Appendix A - Explanation of How the Relevant APR Formula from TILA Regulation Z is Calculated Easily Using Basic Functions in Common Software

The federal Truth in Lending Act (TILA) is implemented in Regulation Z, which details the mathematical formulas for calculating the annual percentage rate (APR) in Appendix J. **The relevant Regulation Z APR formula can be calculated easily using standard industry software programs such as Microsoft Excel or Google Sheets.**

For purposes of illustration, the TILA APR equation can be reduced to the following equation via serval simplifying assumptions.[26] This TILA APR equation is explicitly designed to be used for products repaid daily, weekly, semi-monthly, monthly, and so on.

(1) $$0 = -A + \frac{P_1}{(1+i)^{t_1}} + \frac{P_2}{(1+i)^{t_2}} + \ldots + \frac{P_n}{(1+i)^{t_n}}$$ and (2) $APR = i * m$

Where: A = initial advance i = unit period interest rate (e.g. daily interest rate)
Pj = amount of the payment
Tj = number of full unit periods to the final payment
n = number of payments m = number of periods per year

These Reg Z Formulas Can Be Calculated Using The RATE, IRR and XIRR Functions in Excel

The following functions in Microsoft Excel or Google Sheets can be used to calculate APR consistent with the Regulation Z formula:

1. **For financing products with equal payment amounts and equal payment periods** (e.g., for loans, sales-based financing with flat sales projections or using Historical Method, etc.):

   *APR = RATE (Number of payments, payment amount as a negative number, disbursed amount after fees deducted) * Number of payment periods in one year to annualize*

2. **For financing products with unequal payment amounts, and equal payment periods** (e.g., sales-based financing with projected or retrospective sales volumes that vary over the payment period, with payments every day of the week):

   *APR = IRR (select a series of cells indicating the flow of money, with the disbursed amount in the first cell, followed by cells representing the total charges in each subsequent payment period) * Number of payment periods in one year to annualize*

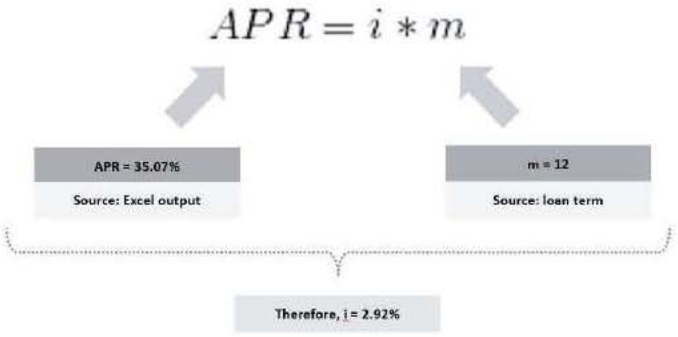
[26] Assumed here that loans have a single disbursement, and all payments occur at full unit-periods. Please see Appendix I for the full Regulation Z APR formula found in Appendix J to Part 1026(b).5.iv.

3. **For financing products with unequal payment amounts, and/or unequal payment periods** (e.g., sales-based financing with projected or retrospective sales volumes that vary over the payment period, with payments on weekdays only):

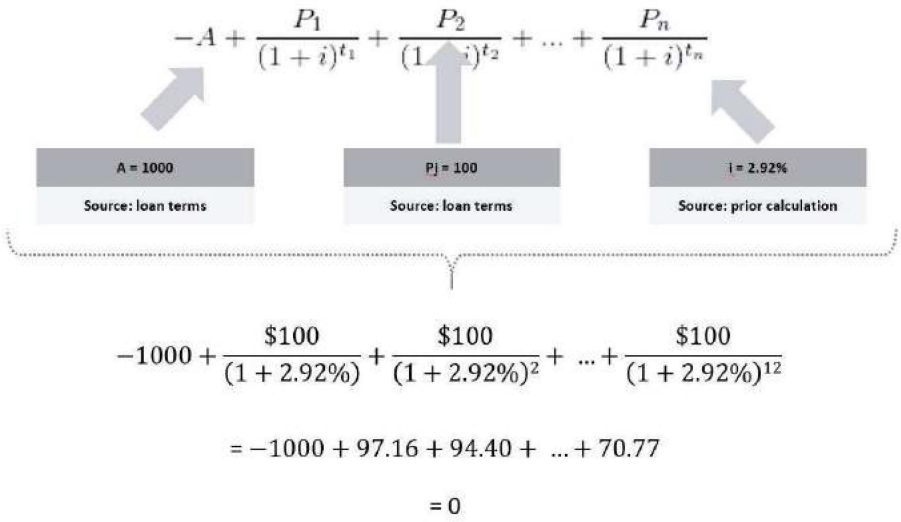
   *APR = ((XIRR (select a series of cells indicating the flow of money, starting with the disbursed amount in the first cell, and a second series of cells indicating the corresponding dates of those payments) +1)^(1/365)-1)*365*

We will use an example to show how the APR calculated from the RATE function is consistent with the TILA APR formula. To illustrate, consider a one year loan with an advance of $1,000, origination fee of $200, and 12 monthly payments of $100. To show that the APR calculated in Excel is consistent with the TILA APR formula, we will plug the APR obtained from the Excel formula described above into the TILA APR equation to show the mathematical conditions are met. The TILA APR equation will resolve to zero, proving that the Excel-derived APR correctly represents the mathematical conditions in Regulation Z.

Step 1: Using the RATE formula in Excel, we derive an APR of 35.07%. By plugging this APR and the number of periods in a year into Regulation Z equation (2), we derive a period interest rate "i" = 2.92%.



Step 2: By plugging A, P1, P2… P12 and i into equation (1), we see that equation (1) simplifies to 0 as required. This means that the Excel APR meets all the mathematical conditions dictated by the TILA APR.



$$-1000 + \frac{\$100}{(1+2.92\%)} + \frac{\$100}{(1+2.92\%)^2} + \ldots + \frac{\$100}{(1+2.92\%)^{12}}$$

$$= -1000 + 97.16 + 94.40 + \ldots + 70.77$$

$$= 0$$

Expanding beyond this example, when used correctly the RATE, IRR and XIRR functions in Excel all return an interest rate that's calculated in a manner that is mathematically consistent with that of the TILA APR.

Following are demonstrations from Microsoft Excel using each of these formulas.

RATE Formula

Comparison to Reg Z

The following spreadsheet shows how the RATE function in Excel produces an APR that's consistent with the TILA APR methodology.
Use case: for loans with equal payments that occur at equal intervals

User Input
Calculated / Linked

Section 1. Input loan terms

In Section 1, we enter the loan terms.

Initial advance	-$1,000.00
Payment per period	$25.00
Payment frequency	Daily
No. of total payments	48
Periods per year	365

Payment Frequencies	***Periods per Year***
Monthly	*12*
Semi-Monthly	*24*
Bi-Weekly	*26*
Weekly	*52*
Daily	*365*

**For weekday payments, see tab 'Weekday RATE'*

Section 2. Calculate interest using RATE()

In Section 2, we use the RATE function in Excel to calculate both the interest per unit period, as well as the annual APR.

Interest rate, unit period	0.77%
APR	281.10%

Section 3. Setting up the Reg Z Equation

In Sections 3 and 4, we verify that the APR calculated from the RATE function is in fact consistent with the TILA APR formula.

In order to do so, we will first map (in Section 3) the user inputted values about the loan to the various variables in the TILA APR formula.

$$0 = -A + \frac{P_1}{(1+i)^{t_1}} + \frac{P_2}{(1+i)^{t_2}} + \ldots + \frac{P_n}{(1+i)^{t_n}}$$

$$APR = i * m$$

Name of variable	Variables	Value	Source
Initial advance	A	-$1,000.00	User input (Section 1)
Payment per period	P1....Pn	$25.00	User input (Section 1)
Interest per period	i	0.77%	Calculated (Section 2)
Periods per year	m	365	Calculated (Section 1)

Section 4. Confirm Reg Z is Satisfied

In Section 4, we will plug the APR obtained from the Excel formula into the TILA APR formula to show the mathematical conditions are met. This is shown by taking the sum off all the values and showing it equals zero. Since cell H44 is zero, we have shown that the APR calculated by Excel is consistent with the TILA APR.

Period	Amount	Reg Z Calculation
0	-$1,000.00	-$1,000.00
1	$25.00	$24.81
2	$25.00	$24.62
3	$25.00	$24.43
4	$25.00	$24.24
5	$25.00	$24.06
6	$25.00	$23.88
7	$25.00	$23.69
8	$25.00	$23.51
9	$25.00	$23.33
10	$25.00	$23.15
11	$25.00	$22.98
12	$25.00	$22.80
13	$25.00	$22.63
14	$25.00	$22.45
15	$25.00	$22.28
16	$25.00	$22.11
17	$25.00	$21.94
18	$25.00	$21.78
19	$25.00	$21.61
20	$25.00	$21.44
21	$25.00	$21.28
22	$25.00	$21.12
23	$25.00	$20.96
24	$25.00	$20.80
25	$25.00	$20.64
26	$25.00	$20.48
27	$25.00	$20.32
28	$25.00	$20.17
29	$25.00	$20.01
30	$25.00	$19.86
31	$25.00	$19.71
32	$25.00	$19.56

Sum	0.00
Is sum zero (nearest cent)	Yes
Satisfies Reg Z	Yes

NOTE: because this table ends at 50 rows, it will not calculate in full for examples with more than 49 payments. To calculate a protect with more payments, simply extend te number of rows in this section.

33	$25.00	$19.41	
34	$25.00	$19.26	
35	$25.00	$19.11	
36	$25.00	$18.97	
37	$25.00	$18.82	
38	$25.00	$18.68	
39	$25.00	$18.54	
40	$25.00	$18.39	
41	$25.00	$18.25	
42	$25.00	$18.11	
43	$25.00	$17.97	
44	$25.00	$17.84	
45	$25.00	$17.70	
46	$25.00	$17.57	
47	$25.00	$17.43	
48	$25.00	$17.30	
49	$0.00	$0.00	
50	$0.00	$0.00	

IRR Formula

Comparison to Reg Z

The following spreadsheet shows how the IRR function in Excel produces an APR that's consistent with the TILA APR methodology.
For ease of illustration, we have limited the Excel template for loans with no more than 52 periods. In production, Excel can handle loans with more than 52 periods.
Use case: for loans with non-equal payments that occur at equal intervals.

User Input
Calculated / Linked

Section 1. Input loan terms

In Section 1, we enter the terms of the loan.

Loan Terms		
Initial advance	-$1,000.00	*(Entered as a negative number)*
Period 1 payment	$90.00	
Period 2 payment	$90.00	
Period 3 payment	$150.00	
Period 4 payment	$0.00	
Period 5 payment	$0.00	
Period 6 payment	$80.00	
Period 7 payment	$50.00	
Period 8 payment	$60.00	
Period 9 payment	$140.00	
Period 10 payment	$100.00	
Period 11 payment	$150.00	
Period 12 payment	$110.00	
Period 13 payment	$0.00	
Period 14 payment	$0.00	
Period 15 payment	$0.00	
Period 16 payment	$0.00	
Period 17 payment	$0.00	
Period 18 payment	$0.00	
Period 19 payment	$0.00	
Period 20 payment	$0.00	
Period 21 payment	$0.00	
Period 22 payment	$0.00	
Period 23 payment	$0.00	
Period 24 payment	$0.00	
Period 25 payment	$0.00	
Period 26 payment	$0.00	
Period 27 payment	$0.00	
Period 28 payment	$0.00	
Period 29 payment	$0.00	
Period 30 payment	$0.00	
Period 31 payment	$0.00	
Period 32 payment	$0.00	
Period 33 payment	$0.00	
Period 34 payment	$0.00	
Period 35 payment	$0.00	
Period 36 payment	$0.00	
Period 37 payment	$0.00	
Period 38 payment	$0.00	
Period 39 payment	$0.00	
Period 40 payment	$0.00	
Period 41 payment	$0.00	
Period 42 payment	$0.00	
Period 43 payment	$0.00	
Period 44 payment	$0.00	
Period 45 payment	$0.00	
Period 46 payment	$0.00	
Period 47 payment	$0.00	
Period 48 payment	$0.00	
Period 49 payment	$0.00	
Period 50 payment	$0.00	
Period 51 payment	$0.00	
Period 52 payment	$0.00	
Payment frequency	Daily	
No. of total payments	10	
Periods per year	365	

Payment Frequencies	***Periods per Year***
Monthly	*12*
Semi-Monthly	*24*
Bi-Weekly	*26*
Weekly	*52*
Daily	*365*

**For equal weekday payments, please see tab 'Weekday RATE'*

Section 2. Calculate interest using IRR()

In Section 2, we use the IRR function in Excel to calculate both the interest per unit period, as well as the annual APR.

Interest rate, unit period	0.28%
APR	101.98%

Section 3. Setting up the Reg Z Equation

In Sections 3 and 4, we want to verify that the APR calculated from the IRR function is in fact consistent with the TILA APR formula.

In order to do so, we will first map (in Section 3) the user inputted values about the loan to the various variables in the TILA APR formula.

$$0 = -A + \frac{P_1}{(1+i)^{t_1}} + \frac{P_2}{(1+i)^{t_2}} + \ldots + \frac{P_n}{(1+i)^{t_n}}$$

$$APR = i * m$$

Name of variable	**Variables**	**Value**	**Source**
Initial advance	A	-$1,000.00	User input (Section 1)
Period 1 payment	P1	$90.00	User input (Section 1)
Period 2 payment	P2	$90.00	User input (Section 1)
Period 3 payment	P3	$150.00	User input (Section 1)
Period 4 payment	P4	$0.00	User input (Section 1)
Period 5 payment	P5	$0.00	User input (Section 1)
Period 6 payment	P6	$80.00	User input (Section 1)
Period 7 payment	P7	$50.00	User input (Section 1)
Period 8 payment	P8	$60.00	User input (Section 1)
Period 9 payment	P9	$140.00	User input (Section 1)
Period 10 payment	P10	$100.00	User input (Section 1)
Period 11 payment	P11	$150.00	User input (Section 1)
Period 12 payment	P12	$110.00	User input (Section 1)
Period 13 payment	P13	$0.00	User input (Section 1)
Period 14 payment	P14	$0.00	User input (Section 1)

	Period 15 payment	P15	$0.00	User input (Section 1)
	Period 16 payment	P16	$0.00	User input (Section 1)
	Period 17 payment	P17	$0.00	User input (Section 1)
	Period 18 payment	P18	$0.00	User input (Section 1)
	Period 19 payment	P19	$0.00	User input (Section 1)
	Period 20 payment	P20	$0.00	User input (Section 1)
	Period 21 payment	P21	$0.00	User input (Section 1)
	Period 22 payment	P22	$0.00	User input (Section 1)
	Period 23 payment	P23	$0.00	User input (Section 1)
	Period 24 payment	P24	$0.00	User input (Section 1)
	Period 25 payment	P25	$0.00	User input (Section 1)
	Period 26 payment	P26	$0.00	User input (Section 1)
	Period 27 payment	P27	$0.00	User input (Section 1)
	Period 28 payment	P28	$0.00	User input (Section 1)
	Period 29 payment	P29	$0.00	User input (Section 1)
	Period 30 payment	P30	$0.00	User input (Section 1)
	Period 31 payment	P31	$0.00	User input (Section 1)
	Period 32 payment	P32	$0.00	User input (Section 1)
	Period 33 payment	P33	$0.00	User input (Section 1)
	Period 34 payment	P34	$0.00	User input (Section 1)
	Period 35 payment	P35	$0.00	User input (Section 1)
	Period 36 payment	P36	$0.00	User input (Section 1)
	Period 37 payment	P37	$0.00	User input (Section 1)
	Period 38 payment	P38	$0.00	User input (Section 1)
	Period 39 payment	P39	$0.00	User input (Section 1)
	Period 40 payment	P40	$0.00	User input (Section 1)
	Period 41 payment	P41	$0.00	User input (Section 1)
	Period 42 payment	P42	$0.00	User input (Section 1)
	Period 43 payment	P43	$0.00	User input (Section 1)
	Period 44 payment	P44	$0.00	User input (Section 1)
	Period 45 payment	P45	$0.00	User input (Section 1)
	Period 46 payment	P46	$0.00	User input (Section 1)
	Period 47 payment	P47	$0.00	User input (Section 1)
	Period 48 payment	P48	$0.00	User input (Section 1)
	Period 49 payment	P49	$0.00	User input (Section 1)
	Period 50 payment	P50	$0.00	User input (Section 1)
	Period 51 payment	P51	$0.00	User input (Section 1)
	Period 52 payment	P52	$0.00	User input (Section 1)
	Interest per period	i	0.28%	Calculated (Section 2)
	Periods per year	m	365	Calculated (Section 1)

Section 4. Confirm Reg Z is Satisfied

In Section 4, we will plug the APR obtained from the Excel formula into the TILA APR formula to show the mathematical conditions are met. This is shown by taking the sum off all the values and showing it equals zero. Since cell H148 is zero, we have shown that the APR calculated by Excel is consistent with the TILA APR.

Period	Amount	Reg Z Calculation
0	-$1,000.00	-$1,000.00
1	$90.00	$89.75
2	$90.00	$89.50
3	$150.00	$148.75
4	$0.00	$0.00
5	$0.00	$0.00
6	$80.00	$78.67
7	$50.00	$49.03
8	$60.00	$58.68
9	$140.00	$136.53
10	$100.00	$97.25
11	$150.00	$145.47
12	$110.00	$106.38
13	$0.00	$0.00
14	$0.00	$0.00
15	$0.00	$0.00
16	$0.00	$0.00
17	$0.00	$0.00
18	$0.00	$0.00
19	$0.00	$0.00
20	$0.00	$0.00
21	$0.00	$0.00
22	$0.00	$0.00
23	$0.00	$0.00
24	$0.00	$0.00
25	$0.00	$0.00
26	$0.00	$0.00
27	$0.00	$0.00
28	$0.00	$0.00
29	$0.00	$0.00
30	$0.00	$0.00
31	$0.00	$0.00
32	$0.00	$0.00
33	$0.00	$0.00
34	$0.00	$0.00
35	$0.00	$0.00
36	$0.00	$0.00
37	$0.00	$0.00
38	$0.00	$0.00
39	$0.00	$0.00
40	$0.00	$0.00
41	$0.00	$0.00
42	$0.00	$0.00
43	$0.00	$0.00
44	$0.00	$0.00
45	$0.00	$0.00
46	$0.00	$0.00
47	$0.00	$0.00
48	$0.00	$0.00
49	$0.00	$0.00
50	$0.00	$0.00
51	$0.00	$0.00
52	$0.00	$0.00

Sum	0.00
Is sum zero (nearest cent)	Yes
Satisfies Reg Z	Yes

XIRR Formula

Comparison to Reg Z

The following spreadsheet shows how the XIRR function in Excel produces an APR that's consistent with the TILA APR methodology.
For ease of illustration, we have limited the Excel template for loans with no more than 52 periods. In production, Excel can handle loans with more than 52 periods.
Use case: for loans with (equal or non-equal) payments that occur at non-equal intervals. In this case, payments occur on weekdays but not weekend days.

User Input
Calculated / Linked

Section 1. Input loan terms

In Section 1, we enter the terms of the loan.

Payment Number	Date	Amount
Initial advance	2-Jan-19	-$1,000
Payment 1	3-Jan-19	$70
Payment 2	4-Jan-19	$107
Payment 3	7-Jan-19	$1
Payment 4	8-Jan-19	$200
Payment 5	9-Jan-19	$70
Payment 6	10-Jan-19	$112
Payment 7	11-Jan-19	$4
Payment 8	14-Jan-19	$136
Payment 9	15-Jan-19	$67
Payment 10	16-Jan-19	$109
Payment 11	17-Jan-19	$109
Payment 12	18-Jan-19	$92
Payment 13	0	0
Payment 14	0	0
Payment 15	0	0
Payment 16	0	0
Payment 17	0	0
Payment 18	0	0
Payment 19	0	0
Payment 20	0	0
Payment 21	0	0
Payment 22	0	0
Payment 23	0	0
Payment 24	0	0
Payment 25	0	0
Payment 26	0	0
Payment 27	0	0
Payment 28	0	0
Payment 29	0	0
Payment 30	0	0
Payment 31	0	0
Payment 32	0	0
Payment 33	0	0
Payment 34	0	0
Payment 35	0	0
Payment 36	0	0
Payment 37	0	0
Payment 38	0	0
Payment 39	0	0
Payment 40	0	0
Payment 41	0	0
Payment 42	0	0
Payment 43	0	0
Payment 44	0	0
Payment 45	0	0
Payment 46	0	0
Payment 47	0	0
Payment 48	0	0
Payment 49	0	0
Payment 50	0	0
Payment 51	0	0
Payment 52	0	0
No. of total payments	12	
Periods per year	365	

Section 2. Calculate interest using XIRR()

In Section 2, we use the XIRR function in Excel to calculate both the interest per unit period, as well as the annual APR.

Interest rate, per day	0.81%
APR	294.39%

Section 3. Setting up the Reg Z Equation

In Sections 3 and 4, we want to verify that the APR calculated from the XIRR function is in fact consistent with the TILA APR formula.

In order to do so, we will first map (in Section 3) the user inputted values about the loan to the various variables in the TILA APR formula.

$$0 = -A + \frac{P_1}{(1+i)^{t_1}} + \frac{P_2}{(1+i)^{t_2}} + \ldots + \frac{P_n}{(1+i)^{t_n}}$$

$$APR = i * m$$

	Payment Variables	Value	Date Variable	Value	Source
Initial advance	A	-$1,000.00	N/A	N/A	User input (Section 1)
Payment 1	P1	$70.00	t1	1	User input (Section 1)
Payment 2	P2	$107.00	t2	2	User input (Section 1)
Payment 3	P3	$1.00	t3	5	User input (Section 1)
Payment 4	P4	$200.00	t4	6	User input (Section 1)
Payment 5	P5	$70.00	t5	7	User input (Section 1)
Payment 6	P6	$112.00	t6	8	User input (Section 1)
Payment 7	P7	$4.00	t7	9	User input (Section 1)
Payment 8	P8	$136.00	t8	12	User input (Section 1)
Payment 9	P9	$67.00	t9	13	User input (Section 1)
Payment 10	P10	$109.00	t10	14	User input (Section 1)
Payment 11	P11	$109.00	t11	15	User input (Section 1)
Payment 12	P12	$92.00	t12	16	User input (Section 1)
Payment 13	P13	$0.00	t13	0	User input (Section 1)

Payment 14	P14	$0.00	t14	0	User input (Section 1)
Payment 15	P15	$0.00	t15	0	User input (Section 1)
Payment 16	P16	$0.00	t16	0	User input (Section 1)
Payment 17	P17	$0.00	t17	0	User input (Section 1)
Payment 18	P18	$0.00	t18	0	User input (Section 1)
Payment 19	P19	$0.00	t19	0	User input (Section 1)
Payment 20	P20	$0.00	t20	0	User input (Section 1)
Payment 21	P21	$0.00	t21	0	User input (Section 1)
Payment 22	P22	$0.00	t22	0	User input (Section 1)
Payment 23	P23	$0.00	t23	0	User input (Section 1)
Payment 24	P24	$0.00	t24	0	User input (Section 1)
Payment 25	P25	$0.00	t25	0	User input (Section 1)
Payment 26	P26	$0.00	t26	0	User input (Section 1)
Payment 27	P27	$0.00	t27	0	User input (Section 1)
Payment 28	P28	$0.00	t28	0	User input (Section 1)
Payment 29	P29	$0.00	t29	0	User input (Section 1)
Payment 30	P30	$0.00	t30	0	User input (Section 1)
Payment 31	P31	$0.00	t31	0	User input (Section 1)
Payment 32	P32	$0.00	t32	0	User input (Section 1)
Payment 33	P33	$0.00	t33	0	User input (Section 1)
Payment 34	P34	$0.00	t34	0	User input (Section 1)
Payment 35	P35	$0.00	t35	0	User input (Section 1)
Payment 36	P36	$0.00	t36	0	User input (Section 1)
Payment 37	P37	$0.00	t37	0	User input (Section 1)
Payment 38	P38	$0.00	t38	0	User input (Section 1)
Payment 39	P39	$0.00	t39	0	User input (Section 1)
Payment 40	P40	$0.00	t40	0	User input (Section 1)
Payment 41	P41	$0.00	t41	0	User input (Section 1)
Payment 42	P42	$0.00	t42	0	User input (Section 1)
Payment 43	P43	$0.00	t43	0	User input (Section 1)
Payment 44	P44	$0.00	t44	0	User input (Section 1)
Payment 45	P45	$0.00	t45	0	User input (Section 1)
Payment 46	P46	$0.00	t46	0	User input (Section 1)
Payment 47	P47	$0.00	t47	0	User input (Section 1)
Payment 48	P48	$0.00	t48	0	User input (Section 1)
Payment 49	P49	$0.00	t49	0	User input (Section 1)
Payment 50	P50	$0.00	t50	0	User input (Section 1)
Payment 51	P51	$0.00	t51	0	User input (Section 1)
Payment 52	P52	$0.00	t52	0	User input (Section 1)
Interest per period	i	0.81%			Calculated (Section 2)
Periods per year	m	365			Calculated (Section 1)

Section 4. Confirm Reg Z is Satisfied

In Section 4, we will plug the APR obtained from the Excel formula into the TILA APR formula to show the mathematical conditions are met. This is shown by taking the sum off all the values and showing it equals zero. Since cell J147 is zero, we have shown that the APR calculated by Excel is consistent with the TILA APR.

Date	Amount	Reg Z Calculation
2-Jan-19	-$1,000.00	-$1,000.00
3-Jan-19	$70.00	$69.44
4-Jan-19	$107.00	$105.29
7-Jan-19	$1.00	$0.96
8-Jan-19	$200.00	$190.59
9-Jan-19	$70.00	$66.17
10-Jan-19	$112.00	$105.03
11-Jan-19	$4.00	$3.72
14-Jan-19	$136.00	$123.50
15-Jan-19	$67.00	$60.36
16-Jan-19	$109.00	$97.41
17-Jan-19	$109.00	$96.63
18-Jan-19	$92.00	$80.90
0-Jan-00	$0.00	$0.00
0-Jan-00	$0.00	$0.00
0-Jan-00	$0.00	$0.00
0-Jan-00	$0.00	$0.00
0-Jan-00	$0.00	$0.00
0-Jan-00	$0.00	$0.00
0-Jan-00	$0.00	$0.00
0-Jan-00	$0.00	$0.00
0-Jan-00	$0.00	$0.00
0-Jan-00	$0.00	$0.00
0-Jan-00	$0.00	$0.00
0-Jan-00	$0.00	$0.00
0-Jan-00	$0.00	$0.00
0-Jan-00	$0.00	$0.00
0-Jan-00	$0.00	$0.00
0-Jan-00	$0.00	$0.00
0-Jan-00	$0.00	$0.00
0-Jan-00	$0.00	$0.00
0-Jan-00	$0.00	$0.00
0-Jan-00	$0.00	$0.00
0-Jan-00	$0.00	$0.00
0-Jan-00	$0.00	$0.00
0-Jan-00	$0.00	$0.00
0-Jan-00	$0.00	$0.00
0-Jan-00	$0.00	$0.00
0-Jan-00	$0.00	$0.00
0-Jan-00	$0.00	$0.00
0-Jan-00	$0.00	$0.00
0-Jan-00	$0.00	$0.00
0-Jan-00	$0.00	$0.00
0-Jan-00	$0.00	$0.00
0-Jan-00	$0.00	$0.00
0-Jan-00	$0.00	$0.00
0-Jan-00	$0.00	$0.00
0-Jan-00	$0.00	$0.00
0-Jan-00	$0.00	$0.00
0-Jan-00	$0.00	$0.00
0-Jan-00	$0.00	$0.00
0-Jan-00	$0.00	$0.00
0-Jan-00	$0.00	$0.00

Sum	0.00
Is sum zero (nearest cent)	Yes
Satisfies Reg Z	Yes

RATE Formula

Comparison to Reg Z

The following spreadsheet shows how the RATE function in Excel produces an APR that's consistent with the TILA APR methodology.
Use case: for loans with equal payments that occur at equal intervals

User Input
Calculated / Linked

Section 1. Input loan terms

In Section 1, we enter the loan terms.

Initial advance	-$1,000.00
Payment per period	$25 00
Payment frequency	Daily
No. of total payments	48
Periods per year	365

Payment Frequencies	*Periods per Year*
Monthly	*12*
Semi-Monthly	*24*
Bi-Weekly	*26*
Weekly	*52*
Daily	*365*

**For weekday payments, see tab 'Weekday RATE'*

Section 2. Calculate interest using RATE()

In Section 2, we use the RATE function in Excel to calculate both the interest per unit period, as well as the annual APR.

Interest rate, unit period	0.77%
APR	281.10%

Section 3. Setting up the Reg Z Equation

In Sections 3 and 4, we verify that the APR calculated from the RATE function is in fact consistent with the TILA APR formula.

In order to do so, we will first map (in Section 3) the user inputted values about the loan to the various variables in the TILA APR formula.

$$0 = -A + \frac{P_1}{(1+i)^{t_1}} + \frac{P_2}{(1+i)^{t_2}} + \ldots + \frac{P_n}{(1+i)^{t_n}}$$

$$APR = i * m$$

Name of variable	Variables	Value	Source
Initial advance	A	-$1,000.00	User input (Section 1)
Payment per period	P1....Pn	$25 00	User input (Section 1)
Interest per period	i	0.77%	Calculated (Section 2)
Periods per year	m	365	Calculated (Section 1)

Section 4. Confirm Reg Z is Satisfied

In Section 4, we will plug the APR obtained from the Excel formula into the TILA APR formula to show the mathematical conditions are met. This is shown by taking the sum off all the values and showing it equals zero. Since cell H44 is zero, we have shown that the APR calculated by Excel is consistent with the TILA APR.

Period	Amount	Reg Z Calculation
0	-$1,000.00	-$1,000.00
1	$25.00	$24 81
2	$25.00	$24.62
3	$25.00	$24.43
4	$25.00	$24 24
5	$25.00	$24 06
6	$25.00	$23 88
7	$25.00	$23.69
8	$25.00	$23 51
9	$25.00	$23 33
10	$25.00	$23.15
11	$25.00	$22 98
12	$25.00	$22 80
13	$25.00	$22.63
14	$25.00	$22.45
15	$25.00	$22 28
16	$25.00	$22.11
17	$25.00	$21 94
18	$25.00	$21.78
19	$25.00	$21.61
20	$25.00	$21.44
21	$25.00	$21 28
22	$25.00	$21.12
23	$25.00	$20 96
24	$25.00	$20 80
25	$25.00	$20.64
26	$25.00	$20.48
27	$25.00	$20 32
28	$25.00	$20.17
29	$25.00	$20 01
30	$25.00	$19 86
31	$25.00	$19.71

Sum	0.00
Is sum zero (nearest cent)	Yes
Satisfies Reg Z	Yes

NOTE: because this table ends at 50 rows, it will not calculate in full for examples with more than 49 payments. To calculate a protect with more payments, simply extend te number of rows in this section.

32	$25.00	$19 56	
33	$25.00	$19.41	
34	$25.00	$19 26	
35	$25.00	$19.11	
36	$25.00	$18 97	
37	$25.00	$18 82	
38	$25.00	$18.68	
39	$25.00	$18 54	
40	$25.00	$18 39	
41	$25.00	$18 25	
42	$25.00	$18.11	
43	$25.00	$17 97	
44	$25.00	$17 84	
45	$25.00	$17.70	
46	$25.00	$17 57	
47	$25.00	$17.43	
48	$25.00	$17 30	
49	$0.00	$0.00	
50	$0.00	$0.00	

IRR Formula

Comparison to Reg Z

The following spreadsheet shows how the IRR function in Excel produces an APR that's consistent with the TILA APR methodology.
For ease of illustration, we have limited the Excel template for loans with no more than 52 periods. In production, Excel can handle loans with more than 52 periods.
Use case: for loans with non-equal payments that occur at equal intervals.

User Input
Calculated / Linked

Section 1. Input loan terms

In Section 1, we enter the terms of the loan.

Loan Terms		
Initial advance	-$1,000.00	*(Entered as a negative number)*
Period 1 payment	$90.00	
Period 2 payment	$90.00	
Period 3 payment	$150.00	
Period 4 payment	$0.00	
Period 5 payment	$0.00	
Period 6 payment	$80.00	
Period 7 payment	$50.00	
Period 8 payment	$60.00	
Period 9 payment	$140.00	
Period 10 payment	$100.00	
Period 11 payment	$150.00	
Period 12 payment	$110.00	
Period 13 payment	$0.00	
Period 14 payment	$0.00	
Period 15 payment	$0.00	
Period 16 payment	$0.00	
Period 17 payment	$0.00	
Period 18 payment	$0.00	
Period 19 payment	$0.00	
Period 20 payment	$0.00	
Period 21 payment	$0.00	
Period 22 payment	$0.00	
Period 23 payment	$0.00	
Period 24 payment	$0.00	
Period 25 payment	$0.00	
Period 26 payment	$0.00	
Period 27 payment	$0.00	
Period 28 payment	$0.00	
Period 29 payment	$0.00	
Period 30 payment	$0.00	
Period 31 payment	$0.00	
Period 32 payment	$0.00	
Period 33 payment	$0.00	
Period 34 payment	$0.00	
Period 35 payment	$0.00	
Period 36 payment	$0.00	
Period 37 payment	$0.00	
Period 38 payment	$0.00	
Period 39 payment	$0.00	
Period 40 payment	$0.00	
Period 41 payment	$0.00	
Period 42 payment	$0.00	
Period 43 payment	$0.00	
Period 44 payment	$0.00	
Period 45 payment	$0.00	
Period 46 payment	$0.00	
Period 47 payment	$0.00	
Period 48 payment	$0.00	
Period 49 payment	$0.00	
Period 50 payment	$0.00	
Period 51 payment	$0.00	
Period 52 payment	$0.00	
Payment frequency	Daily	
No. of total payments	10	
Periods per year	365	

Payment Frequencies	*Periods per Year*
Monthly	*12*
Semi-Monthly	*24*
Bi-Weekly	*26*
Weekly	*52*
Daily	*365*

**For equal weekday payments, please see tab 'Weekday RATE'*

Section 2. Calculate interest using IRR()

In Section 2, we use the IRR function in Excel to calculate both the interest per unit period, as well as the annual APR.

Interest rate, unit period	**0.28%**
APR	**101.98%**

Section 3. Setting up the Reg Z Equation

In Sections 3 and 4, we want to verify that the APR calculated from the IRR function is in fact consistent with the TILA APR formula.

In order to do so, we will first map (in Section 3) the user inputted values about the loan to the various variables in the TILA APR formula.

$$0 = -A + \frac{P_1}{(1+i)^{t_1}} + \frac{P_2}{(1+i)^{t_2}} + \ldots + \frac{P_n}{(1+i)^{t_n}}$$

$$APR = i * m$$

Name of variable	Variables	Value	Source
Initial advance	A	-$1,000.00	User input (Section 1)
Period 1 payment	P1	$90.00	User input (Section 1)
Period 2 payment	P2	$90.00	User input (Section 1)
Period 3 payment	P3	$150.00	User input (Section 1)
Period 4 payment	P4	$0.00	User input (Section 1)
Period 5 payment	P5	$0.00	User input (Section 1)
Period 6 payment	P6	$80.00	User input (Section 1)
Period 7 payment	P7	$50.00	User input (Section 1)
Period 8 payment	P8	$60.00	User input (Section 1)
Period 9 payment	P9	$140.00	User input (Section 1)
Period 10 payment	P10	$100.00	User input (Section 1)
Period 11 payment	P11	$150.00	User input (Section 1)
Period 12 payment	P12	$110.00	User input (Section 1)

	Period 13 payment	P13	$0.00	User input (Section 1)
	Period 14 payment	P14	$0.00	User input (Section 1)
	Period 15 payment	P15	$0.00	User input (Section 1)
	Period 16 payment	P16	$0.00	User input (Section 1)
	Period 17 payment	P17	$0.00	User input (Section 1)
	Period 18 payment	P18	$0.00	User input (Section 1)
	Period 19 payment	P19	$0.00	User input (Section 1)
	Period 20 payment	P20	$0.00	User input (Section 1)
	Period 21 payment	P21	$0.00	User input (Section 1)
	Period 22 payment	P22	$0.00	User input (Section 1)
	Period 23 payment	P23	$0.00	User input (Section 1)
	Period 24 payment	P24	$0.00	User input (Section 1)
	Period 25 payment	P25	$0.00	User input (Section 1)
	Period 26 payment	P26	$0.00	User input (Section 1)
	Period 27 payment	P27	$0.00	User input (Section 1)
	Period 28 payment	P28	$0.00	User input (Section 1)
	Period 29 payment	P29	$0.00	User input (Section 1)
	Period 30 payment	P30	$0.00	User input (Section 1)
	Period 31 payment	P31	$0.00	User input (Section 1)
	Period 32 payment	P32	$0.00	User input (Section 1)
	Period 33 payment	P33	$0.00	User input (Section 1)
	Period 34 payment	P34	$0.00	User input (Section 1)
	Period 35 payment	P35	$0.00	User input (Section 1)
	Period 36 payment	P36	$0.00	User input (Section 1)
	Period 37 payment	P37	$0.00	User input (Section 1)
	Period 38 payment	P38	$0.00	User input (Section 1)
	Period 39 payment	P39	$0.00	User input (Section 1)
	Period 40 payment	P40	$0.00	User input (Section 1)
	Period 41 payment	P41	$0.00	User input (Section 1)
	Period 42 payment	P42	$0.00	User input (Section 1)
	Period 43 payment	P43	$0.00	User input (Section 1)
	Period 44 payment	P44	$0.00	User input (Section 1)
	Period 45 payment	P45	$0.00	User input (Section 1)
	Period 46 payment	P46	$0.00	User input (Section 1)
	Period 47 payment	P47	$0.00	User input (Section 1)
	Period 48 payment	P48	$0.00	User input (Section 1)
	Period 49 payment	P49	$0.00	User input (Section 1)
	Period 50 payment	P50	$0.00	User input (Section 1)
	Period 51 payment	P51	$0.00	User input (Section 1)
	Period 52 payment	P52	$0.00	User input (Section 1)
	Interest per period	i	0.28%	Calculated (Section 2)
	Periods per year	m	365	Calculated (Section 1)

Section 4. Confirm Reg Z is Satisfied

In Section 4, we will plug the APR obtained from the Excel formula into the TILA APR formula to show the mathematical conditions are met. This is shown by taking the sum off all the values and showing it equals zero. Since cell H148 is zero, we have shown that the APR calculated by Excel is consistent with the TILA APR.

Period	Amount	Reg Z Calculation
0	-$1,000.00	-$1,000.00
1	$90.00	$89.75
2	$90.00	$89.50
3	$150.00	$148.75
4	$0.00	$0.00
5	$0.00	$0.00
6	$80.00	$78.67
7	$50.00	$49.03
8	$60.00	$58.68
9	$140.00	$136.53
10	$100.00	$97.25
11	$150.00	$145.47
12	$110.00	$106.38
13	$0.00	$0.00
14	$0.00	$0.00
15	$0.00	$0.00
16	$0.00	$0.00
17	$0.00	$0.00
18	$0.00	$0.00
19	$0.00	$0.00
20	$0.00	$0.00
21	$0.00	$0.00
22	$0.00	$0.00
23	$0.00	$0.00
24	$0.00	$0.00
25	$0.00	$0.00
26	$0.00	$0.00
27	$0.00	$0.00
28	$0.00	$0.00
29	$0.00	$0.00
30	$0.00	$0.00
31	$0.00	$0.00
32	$0.00	$0.00
33	$0.00	$0.00
34	$0.00	$0.00
35	$0.00	$0.00
36	$0.00	$0.00
37	$0.00	$0.00
38	$0.00	$0.00
39	$0.00	$0.00
40	$0.00	$0.00
41	$0.00	$0.00
42	$0.00	$0.00
43	$0.00	$0.00
44	$0.00	$0.00
45	$0.00	$0.00
46	$0.00	$0.00
47	$0.00	$0.00
48	$0.00	$0.00
49	$0.00	$0.00
50	$0.00	$0.00
51	$0.00	$0.00
52	$0.00	$0.00

Sum	0.00
Is sum zero (nearest cent)	Yes
Satisfies Reg Z	Yes

XIRR Formula

Comparison to Reg Z

The following spreadsheet shows how the XIRR function in Excel produces an APR that's consistent with the TILA APR methodology.
For ease of illustration, we have limited the Excel template for loans with no more than 52 periods. In production, Excel can handle loans with more than 52 periods.
Use case: for loans with (equal or non-equal) payments that occur at non-equal intervals. In this case, payments occur on weekdays but not weekend days.

User Input
Calculated / Linked

Section 1. Input loan terms

In Section 1, we enter the terms of the loan.

Payment Number	Date	Amount
Initial advance	2-Jan-19	-$1,000
Payment 1	3-Jan-19	$70
Payment 2	4-Jan-19	$107
Payment 3	7-Jan-19	$1
Payment 4	8-Jan-19	$200
Payment 5	9-Jan-19	$70
Payment 6	10-Jan-19	$112
Payment 7	11-Jan-19	$4
Payment 8	14-Jan-19	$136
Payment 9	15-Jan-19	$67
Payment 10	16-Jan-19	$109
Payment 11	17-Jan-19	$109
Payment 12	18-Jan-19	$92
Payment 13	0	0
Payment 14	0	0
Payment 15	0	0
Payment 16	0	0
Payment 17	0	0
Payment 18	0	0
Payment 19	0	0
Payment 20	0	0
Payment 21	0	0
Payment 22	0	0
Payment 23	0	0
Payment 24	0	0
Payment 25	0	0
Payment 26	0	0
Payment 27	0	0
Payment 28	0	0
Payment 29	0	0
Payment 30	0	0
Payment 31	0	0
Payment 32	0	0
Payment 33	0	0
Payment 34	0	0
Payment 35	0	0
Payment 36	0	0
Payment 37	0	0
Payment 38	0	0
Payment 39	0	0
Payment 40	0	0
Payment 41	0	0
Payment 42	0	0
Payment 43	0	0
Payment 44	0	0
Payment 45	0	0
Payment 46	0	0
Payment 47	0	0
Payment 48	0	0
Payment 49	0	0
Payment 50	0	0
Payment 51	0	0
Payment 52	0	0
No. of total payments	12	
Periods per year	365	

Section 2. Calculate interest using XIRR()

In Section 2, we use the XIRR function in Excel to calculate both the interest per unit period, as well as the annual APR.

Interest rate, per day	0.81%
APR	294.39%

Section 3. Setting up the Reg Z Equation

In Sections 3 and 4, we want to verify that the APR calculated from the XIRR function is in fact consistent with the TILA APR formula.

In order to do so, we will first map (in Section 3) the user inputted values about the loan to the various variables in the TILA APR formula.

$$0 = -A + \frac{P_1}{(1+i)^{t_1}} + \frac{P_2}{(1+i)^{t_2}} + \ldots + \frac{P_n}{(1+i)^{t_n}}$$

$$APR = i * m$$

	Payment Variables	Value	Date Variable	Value	Source
Initial advance	A	-$1,000.00	N/A	N/A	User input (Section 1)
Payment 1	P1	$70.00	t1	1	User input (Section 1)
Payment 2	P2	$107.00	t2	2	User input (Section 1)
Payment 3	P3	$1.00	t3	5	User input (Section 1)
Payment 4	P4	$200.00	t4	6	User input (Section 1)
Payment 5	P5	$70.00	t5	7	User input (Section 1)
Payment 6	P6	$112.00	t6	8	User input (Section 1)
Payment 7	P7	$4.00	t7	9	User input (Section 1)
Payment 8	P8	$136.00	t8	12	User input (Section 1)
Payment 9	P9	$67.00	t9	13	User input (Section 1)
Payment 10	P10	$109.00	t10	14	User input (Section 1)
Payment 11	P11	$109.00	t11	15	User input (Section 1)
Payment 12	P12	$92.00	t12	16	User input (Section 1)
Payment 13	P13	$0.00	t13	0	User input (Section 1)

Payment 14	P14	$0.00	t14	0	User input (Section 1)
Payment 15	P15	$0.00	t15	0	User input (Section 1)
Payment 16	P16	$0.00	t16	0	User input (Section 1)
Payment 17	P17	$0.00	t17	0	User input (Section 1)
Payment 18	P18	$0.00	t18	0	User input (Section 1)
Payment 19	P19	$0.00	t19	0	User input (Section 1)
Payment 20	P20	$0.00	t20	0	User input (Section 1)
Payment 21	P21	$0.00	t21	0	User input (Section 1)
Payment 22	P22	$0.00	t22	0	User input (Section 1)
Payment 23	P23	$0.00	t23	0	User input (Section 1)
Payment 24	P24	$0.00	t24	0	User input (Section 1)
Payment 25	P25	$0.00	t25	0	User input (Section 1)
Payment 26	P26	$0.00	t26	0	User input (Section 1)
Payment 27	P27	$0.00	t27	0	User input (Section 1)
Payment 28	P28	$0.00	t28	0	User input (Section 1)
Payment 29	P29	$0.00	t29	0	User input (Section 1)
Payment 30	P30	$0.00	t30	0	User input (Section 1)
Payment 31	P31	$0.00	t31	0	User input (Section 1)
Payment 32	P32	$0.00	t32	0	User input (Section 1)
Payment 33	P33	$0.00	t33	0	User input (Section 1)
Payment 34	P34	$0.00	t34	0	User input (Section 1)
Payment 35	P35	$0.00	t35	0	User input (Section 1)
Payment 36	P36	$0.00	t36	0	User input (Section 1)
Payment 37	P37	$0.00	t37	0	User input (Section 1)
Payment 38	P38	$0.00	t38	0	User input (Section 1)
Payment 39	P39	$0.00	t39	0	User input (Section 1)
Payment 40	P40	$0.00	t40	0	User input (Section 1)
Payment 41	P41	$0.00	t41	0	User input (Section 1)
Payment 42	P42	$0.00	t42	0	User input (Section 1)
Payment 43	P43	$0.00	t43	0	User input (Section 1)
Payment 44	P44	$0.00	t44	0	User input (Section 1)
Payment 45	P45	$0.00	t45	0	User input (Section 1)
Payment 46	P46	$0.00	t46	0	User input (Section 1)
Payment 47	P47	$0.00	t47	0	User input (Section 1)
Payment 48	P48	$0.00	t48	0	User input (Section 1)
Payment 49	P49	$0.00	t49	0	User input (Section 1)
Payment 50	P50	$0.00	t50	0	User input (Section 1)
Payment 51	P51	$0.00	t51	0	User input (Section 1)
Payment 52	P52	$0.00	t52	0	User input (Section 1)
Interest per period	i	0.81%			Calculated (Section 2)
Periods per year	m	365			Calculated (Section 1)

Section 4. Confirm Reg Z is Satisfied

In Section 4, we will plug the APR obtained from the Excel formula into the TILA APR formula to show the mathematical conditions are met. This is shown by taking the sum off all the values and showing it equals zero. Since cell J147 is zero, we have shown that the APR calculated by Excel is consistent with the TILA APR.

Date	Amount	Reg Z Calculation
2-Jan-19	-$1,000.00	-$1,000.00
3-Jan-19	$70.00	$69.44
4-Jan-19	$107.00	$105.29
7-Jan-19	$1.00	$0.96
8-Jan-19	$200.00	$190.59
9-Jan-19	$70.00	$66.17
10-Jan-19	$112.00	$105.03
11-Jan-19	$4.00	$3.72
14-Jan-19	$136.00	$123.50
15-Jan-19	$67.00	$60.36
16-Jan-19	$109.00	$97.41
17-Jan-19	$109.00	$96.63
18-Jan-19	$92.00	$80.90
0-Jan-00	$0.00	$0.00
0-Jan-00	$0.00	$0.00
0-Jan-00	$0.00	$0.00
0-Jan-00	$0.00	$0.00
0-Jan-00	$0.00	$0.00
0-Jan-00	$0.00	$0.00
0-Jan-00	$0.00	$0.00
0-Jan-00	$0.00	$0.00
0-Jan-00	$0.00	$0.00
0-Jan-00	$0.00	$0.00
0-Jan-00	$0.00	$0.00
0-Jan-00	$0.00	$0.00
0-Jan-00	$0.00	$0.00
0-Jan-00	$0.00	$0.00
0-Jan-00	$0.00	$0.00
0-Jan-00	$0.00	$0.00
0-Jan-00	$0.00	$0.00
0-Jan-00	$0.00	$0.00
0-Jan-00	$0.00	$0.00
0-Jan-00	$0.00	$0.00
0-Jan-00	$0.00	$0.00
0-Jan-00	$0.00	$0.00
0-Jan-00	$0.00	$0.00
0-Jan-00	$0.00	$0.00
0-Jan-00	$0.00	$0.00
0-Jan-00	$0.00	$0.00
0-Jan-00	$0.00	$0.00
0-Jan-00	$0.00	$0.00
0-Jan-00	$0.00	$0.00
0-Jan-00	$0.00	$0.00
0-Jan-00	$0.00	$0.00
0-Jan-00	$0.00	$0.00
0-Jan-00	$0.00	$0.00
0-Jan-00	$0.00	$0.00
0-Jan-00	$0.00	$0.00
0-Jan-00	$0.00	$0.00
0-Jan-00	$0.00	$0.00
0-Jan-00	$0.00	$0.00
0-Jan-00	$0.00	$0.00
0-Jan-00	$0.00	$0.00

Sum	0.00
Is sum zero (nearest cent)	Yes
Satisfies Reg Z	Yes

RATE Formula - Weekday Payments

Comparison to Reg Z

The following spreadsheet shows how the RATE function in Excel produces an APR that's consistent with the TILA APR met
For the purpose of illustartion, this Excel template is designed for loans with a term of no more than 2 years for ease of illu
Use case: for loans with equal weekday payments.

User Input
Calculated / Linked

Section 1. Input loan terms

In Section 1, we enter the terms of the loan. Since the loan has payments on weekdays only, we will use a daily payment approximation. The daily payment approximation is easy computationally and fairly accurate.

Loan Terms	
Initial advance	-$1,000.00
Payment per period	$13.00
Start Date	2-Jan-19
End Date	31-Dec-19
Number of payments	251
Daily Payment Approximation	
Total payment	$3,263.00
No of days	364
Average daily payment	$8.96
No of days in a year	365

**Lenders can customize this list to reflect any weekdays that are not a payme*
assumed bank holidays are non-payment days.

Section 2. Calculate interest using RATE() approximation

In Section 2, we use the RATE function in Excel to calculate both the interest per unit period, as well as the annual APR.

Interest rate, unit period	0.86%
APR	312.50%

Section 3. Setting up the Reg Z Equation

In Sections 3 and 4, we want to verify that the APR calculated from the RATE function is in fact consistent with the TILA APR formula.

In order to do so, we will first map (in Section 3) the user inputted values about the loan to the various variables in the TILA APR formula.

$$0 = -A + \frac{P_1}{(1+i)^{t_1}} + \frac{P_2}{(1+i)^{t_2}} + \ldots + \frac{P_n}{(1+i)^{t_n}}$$

$$APR = i * m$$

Name of variable	Variables	Value
Initial advance	A	-$1,000.00
Payment per period	P1....Pn	$13.00
Interest per period	i	0.86%
Periods per year	m	365

Section 4. Confirm Reg Z is Satisfied

In Section 4, we will plug the APR obtained from the Excel formula into the TILA APR formula to show the mathematical conditions are met. This is shown by taking the sum off all the values and showing it equals zero. Since cell J53 is zero, we have shown that the APR calculated by Excel is consistent with the TILA APR.

Period	Amount	Reg Z Calculation
0	-$1,000.00	-$1,000.00
1	$8.96	$8.89
2	$8.96	$8.81
3	$8.96	$8.74
4	$8.96	$8.66
5	$8.96	$8.59
6	$8.96	$8.52
7	$8.96	$8.44
8	$8.96	$8.37
9	$8.96	$8.30
10	$8.96	$8.23
11	$8.96	$8.16
12	$8.96	$8.09
13	$8.96	$8.02
14	$8.96	$7.96
15	$8.96	$7.89
16	$8.96	$7.82

17	$8.96	$7.75
18	$8.96	$7.69
19	$8.96	$7.62
20	$8.96	$7.56
21	$8.96	$7.49
22	$8.96	$7.43
23	$8.96	$7.37
24	$8.96	$7.31
25	$8.96	$7.24
26	$8.96	$7.18
27	$8.96	$7.12
28	$8.96	$7.06
29	$8.96	$7.00
30	$8.96	$6.94
31	$8.96	$6.88
32	$8.96	$6.82
33	$8.96	$6.77
34	$8.96	$6.71
35	$8.96	$6.65
36	$8.96	$6.60
37	$8.96	$6.54
38	$8.96	$6.48
39	$8.96	$6.43
40	$8.96	$6.37
41	$8.96	$6.32
42	$8.96	$6.27
43	$8.96	$6.21
44	$8.96	$6.16
45	$8.96	$6.11
46	$8.96	$6.06
47	$8.96	$6.00
48	$8.96	$5.95
49	$8.96	$5.90
50	$8.96	$5.85

51	$8.96	$5.80
52	$8.96	$5.75
53	$8.96	$5.71
54	$8.96	$5.66
55	$8.96	$5.61
56	$8.96	$5.56
57	$8.96	$5.51
58	$8.96	$5.47
59	$8.96	$5.42
60	$8.96	$5.37
61	$8.96	$5.33
62	$8.96	$5.28
63	$8.96	$5.24
64	$8.96	$5.19
65	$8.96	$5.15
66	$8.96	$5.11
67	$8.96	$5.06
68	$8.96	$5.02
69	$8.96	$4.98
70	$8.96	$4.94
71	$8.96	$4.89
72	$8.96	$4.85
73	$8.96	$4.81
74	$8.96	$4.77
75	$8.96	$4.73
76	$8.96	$4.69
77	$8.96	$4.65
78	$8.96	$4.61
79	$8.96	$4.57
80	$8.96	$4.53
81	$8.96	$4.49
82	$8.96	$4.46
83	$8.96	$4.42
84	$8.96	$4.38

85	$8.96	$4.34
86	$8.96	$4.31
87	$8.96	$4.27
88	$8.96	$4.23
89	$8.96	$4.20
90	$8.96	$4.16
91	$8.96	$4.13
92	$8.96	$4.09
93	$8.96	$4.06
94	$8.96	$4.02
95	$8.96	$3.99
96	$8.96	$3.95
97	$8.96	$3.92
98	$8.96	$3.89
99	$8.96	$3.85
100	$8.96	$3.82
101	$8.96	$3.79
102	$8.96	$3.76
103	$8.96	$3.73
104	$8.96	$3.69
105	$8.96	$3.66
106	$8.96	$3.63
107	$8.96	$3.60
108	$8.96	$3.57
109	$8.96	$3.54
110	$8.96	$3.51
111	$8.96	$3.48
112	$8.96	$3.45
113	$8.96	$3.42
114	$8.96	$3.39
115	$8.96	$3.36
116	$8.96	$3.33
117	$8.96	$3.31
118	$8.96	$3.28

119	$8.96	$3.25
120	$8.96	$3.22
121	$8.96	$3.20
122	$8.96	$3.17
123	$8.96	$3.14
124	$8.96	$3.11
125	$8.96	$3.09
126	$8.96	$3.06
127	$8.96	$3.04
128	$8.96	$3.01
129	$8.96	$2.98
130	$8.96	$2.96
131	$8.96	$2.93
132	$8.96	$2.91
133	$8.96	$2.88
134	$8.96	$2.86
135	$8.96	$2.84
136	$8.96	$2.81
137	$8.96	$2.79
138	$8.96	$2.76
139	$8.96	$2.74
140	$8.96	$2.72
141	$8.96	$2.69
142	$8.96	$2.67
143	$8.96	$2.65
144	$8.96	$2.63
145	$8.96	$2.60
146	$8.96	$2.58
147	$8.96	$2.56
148	$8.96	$2.54
149	$8.96	$2.52
150	$8.96	$2.50
151	$8.96	$2.47
152	$8.96	$2.45

153	$8.96	$2.43
154	$8.96	$2.41
155	$8.96	$2.39
156	$8.96	$2.37
157	$8.96	$2.35
158	$8.96	$2.33
159	$8.96	$2.31
160	$8.96	$2.29
161	$8.96	$2.27
162	$8.96	$2.25
163	$8.96	$2.23
164	$8.96	$2.21
165	$8.96	$2.20
166	$8.96	$2.18
167	$8.96	$2.16
168	$8.96	$2.14
169	$8.96	$2.12
170	$8.96	$2.10
171	$8.96	$2.09
172	$8.96	$2.07
173	$8.96	$2.05
174	$8.96	$2.03
175	$8.96	$2.02
176	$8.96	$2.00
177	$8.96	$1.98
178	$8.96	$1.97
179	$8.96	$1.95
180	$8.96	$1.93
181	$8.96	$1.92
182	$8.96	$1.90
183	$8.96	$1.88
184	$8.96	$1.87
185	$8.96	$1.85
186	$8.96	$1.84

187	$8.96	$1.82
188	$8.96	$1.80
189	$8.96	$1.79
190	$8.96	$1.77
191	$8.96	$1.76
192	$8.96	$1.74
193	$8.96	$1.73
194	$8.96	$1.71
195	$8.96	$1.70
196	$8.96	$1.69
197	$8.96	$1.67
198	$8.96	$1.66
199	$8.96	$1.64
200	$8.96	$1.63
201	$8.96	$1.62
202	$8.96	$1.60
203	$8.96	$1.59
204	$8.96	$1.57
205	$8.96	$1.56
206	$8.96	$1.55
207	$8.96	$1.53
208	$8.96	$1.52
209	$8.96	$1.51
210	$8.96	$1.50
211	$8.96	$1.48
212	$8.96	$1.47
213	$8.96	$1.46
214	$8.96	$1.45
215	$8.96	$1.43
216	$8.96	$1.42
217	$8.96	$1.41
218	$8.96	$1.40
219	$8.96	$1.39
220	$8.96	$1.37

221	$8.96	$1.36
222	$8.96	$1.35
223	$8.96	$1.34
224	$8.96	$1.33
225	$8.96	$1.32
226	$8.96	$1.31
227	$8.96	$1.29
228	$8.96	$1.28
229	$8.96	$1.27
230	$8.96	$1.26
231	$8.96	$1.25
232	$8.96	$1.24
233	$8.96	$1.23
234	$8.96	$1.22
235	$8.96	$1.21
236	$8.96	$1.20
237	$8.96	$1.19
238	$8.96	$1.18
239	$8.96	$1.17
240	$8.96	$1.16
241	$8.96	$1.15
242	$8.96	$1.14
243	$8.96	$1.13
244	$8.96	$1.12
245	$8.96	$1.11
246	$8.96	$1.10
247	$8.96	$1.09
248	$8.96	$1.08
249	$8.96	$1.07
250	$8.96	$1.06
251	$8.96	$1.05
252	$8.96	$1.05
253	$8.96	$1.04
254	$8.96	$1.03

255	$8.96	$1.02
256	$8.96	$1.01
257	$8.96	$1.00
258	$8.96	$0.99
259	$8.96	$0.99
260	$8.96	$0.98
261	$8.96	$0.97
262	$8.96	$0.96
263	$8.96	$0.95
264	$8.96	$0.94
265	$8.96	$0.94
266	$8.96	$0.93
267	$8.96	$0.92
268	$8.96	$0.91
269	$8.96	$0.90
270	$8.96	$0.90
271	$8.96	$0.89
272	$8.96	$0.88
273	$8.96	$0.87
274	$8.96	$0.87
275	$8.96	$0.86
276	$8.96	$0.85
277	$8.96	$0.85
278	$8.96	$0.84
279	$8.96	$0.83
280	$8.96	$0.82
281	$8.96	$0.82
282	$8.96	$0.81
283	$8.96	$0.80
284	$8.96	$0.80
285	$8.96	$0.79
286	$8.96	$0.78
287	$8.96	$0.78
288	$8.96	$0.77

289	$8.96	$0.76
290	$8.96	$0.76
291	$8.96	$0.75
292	$8.96	$0.74
293	$8.96	$0.74
294	$8.96	$0.73
295	$8.96	$0.72
296	$8.96	$0.72
297	$8.96	$0.71
298	$8.96	$0.71
299	$8.96	$0.70
300	$8.96	$0.69
301	$8.96	$0.69
302	$8.96	$0.68
303	$8.96	$0.68
304	$8.96	$0.67
305	$8.96	$0.67
306	$8.96	$0.66
307	$8.96	$0.65
308	$8.96	$0.65
309	$8.96	$0.64
310	$8.96	$0.64
311	$8.96	$0.63
312	$8.96	$0.63
313	$8.96	$0.62
314	$8.96	$0.62
315	$8.96	$0.61
316	$8.96	$0.61
317	$8.96	$0.60
318	$8.96	$0.60
319	$8.96	$0.59
320	$8.96	$0.59
321	$8.96	$0.58
322	$8.96	$0.58

323	$8.96	$0.57
324	$8.96	$0.57
325	$8.96	$0.56
326	$8.96	$0.56
327	$8.96	$0.55
328	$8.96	$0.55
329	$8.96	$0.54
330	$8.96	$0.54
331	$8.96	$0.53
332	$8.96	$0.53
333	$8.96	$0.52
334	$8.96	$0.52
335	$8.96	$0.52
336	$8.96	$0.51
337	$8.96	$0.51
338	$8.96	$0.50
339	$8.96	$0.50
340	$8.96	$0.49
341	$8.96	$0.49
342	$8.96	$0.49
343	$8.96	$0.48
344	$8.96	$0.48
345	$8.96	$0.47
346	$8.96	$0.47
347	$8.96	$0.47
348	$8.96	$0.46
349	$8.96	$0.46
350	$8.96	$0.45
351	$8.96	$0.45
352	$8.96	$0.45
353	$8.96	$0.44
354	$8.96	$0.44
355	$8.96	$0.43
356	$8.96	$0.43

357	$8.96	$0.43
358	$8.96	$0.42
359	$8.96	$0.42
360	$8.96	$0.42
361	$8.96	$0.41
362	$8.96	$0.41
363	$8.96	$0.41
364	$8.96	$0.40
365	$0.00	$0.00
366	$0.00	$0.00
367	$0.00	$0.00
368	$0.00	$0.00
369	$0.00	$0.00
370	$0.00	$0.00
371	$0.00	$0.00
372	$0.00	$0.00
373	$0.00	$0.00
374	$0.00	$0.00
375	$0.00	$0.00
376	$0.00	$0.00
377	$0.00	$0.00
378	$0.00	$0.00
379	$0.00	$0.00
380	$0.00	$0.00
381	$0.00	$0.00
382	$0.00	$0.00
383	$0.00	$0.00
384	$0.00	$0.00
385	$0.00	$0.00
386	$0.00	$0.00
387	$0.00	$0.00
388	$0.00	$0.00
389	$0.00	$0.00
390	$0.00	$0.00

391	$0.00	$0.00
392	$0.00	$0.00
393	$0.00	$0.00
394	$0.00	$0.00
395	$0.00	$0.00
396	$0.00	$0.00
397	$0.00	$0.00
398	$0.00	$0.00
399	$0.00	$0.00
400	$0.00	$0.00
401	$0.00	$0.00
402	$0.00	$0.00
403	$0.00	$0.00
404	$0.00	$0.00
405	$0.00	$0.00
406	$0.00	$0.00
407	$0.00	$0.00
408	$0.00	$0.00
409	$0.00	$0.00
410	$0.00	$0.00
411	$0.00	$0.00
412	$0.00	$0.00
413	$0.00	$0.00
414	$0.00	$0.00
415	$0.00	$0.00
416	$0.00	$0.00
417	$0.00	$0.00
418	$0.00	$0.00
419	$0.00	$0.00
420	$0.00	$0.00
421	$0.00	$0.00
422	$0.00	$0.00
423	$0.00	$0.00
424	$0.00	$0.00

425	$0.00	$0.00
426	$0.00	$0.00
427	$0.00	$0.00
428	$0.00	$0.00
429	$0.00	$0.00
430	$0.00	$0.00
431	$0.00	$0.00
432	$0.00	$0.00
433	$0.00	$0.00
434	$0.00	$0.00
435	$0.00	$0.00
436	$0.00	$0.00
437	$0.00	$0.00
438	$0.00	$0.00
439	$0.00	$0.00
440	$0.00	$0.00
441	$0.00	$0.00
442	$0.00	$0.00
443	$0.00	$0.00
444	$0.00	$0.00
445	$0.00	$0.00
446	$0.00	$0.00
447	$0.00	$0.00
448	$0.00	$0.00
449	$0.00	$0.00
450	$0.00	$0.00
451	$0.00	$0.00
452	$0.00	$0.00
453	$0.00	$0.00
454	$0.00	$0.00
455	$0.00	$0.00
456	$0.00	$0.00
457	$0.00	$0.00
458	$0.00	$0.00

459	$0.00	$0.00
460	$0.00	$0.00
461	$0.00	$0.00
462	$0.00	$0.00
463	$0.00	$0.00
464	$0.00	$0.00
465	$0.00	$0.00
466	$0.00	$0.00
467	$0.00	$0.00
468	$0.00	$0.00
469	$0.00	$0.00
470	$0.00	$0.00
471	$0.00	$0.00
472	$0.00	$0.00
473	$0.00	$0.00
474	$0.00	$0.00
475	$0.00	$0.00
476	$0.00	$0.00
477	$0.00	$0.00
478	$0.00	$0.00
479	$0.00	$0.00
480	$0.00	$0.00
481	$0.00	$0.00
482	$0.00	$0.00
483	$0.00	$0.00
484	$0.00	$0.00
485	$0.00	$0.00
486	$0.00	$0.00
487	$0.00	$0.00
488	$0.00	$0.00
489	$0.00	$0.00
490	$0.00	$0.00
491	$0.00	$0.00
492	$0.00	$0.00

493	$0.00	$0.00
494	$0.00	$0.00
495	$0.00	$0.00
496	$0.00	$0.00
497	$0.00	$0.00
498	$0.00	$0.00
499	$0.00	$0.00
500	$0.00	$0.00
501	$0.00	$0.00
502	$0.00	$0.00
503	$0.00	$0.00
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506	$0.00	$0.00
507	$0.00	$0.00
508	$0.00	$0.00
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531	$0.00	$0.00
532	$0.00	$0.00
533	$0.00	$0.00
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539	$0.00	$0.00
540	$0.00	$0.00
541	$0.00	$0.00
542	$0.00	$0.00
543	$0.00	$0.00
544	$0.00	$0.00
545	$0.00	$0.00
546	$0.00	$0.00
547	$0.00	$0.00
548	$0.00	$0.00
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561	$0.00	$0.00
562	$0.00	$0.00
563	$0.00	$0.00
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565	$0.00	$0.00
566	$0.00	$0.00
567	$0.00	$0.00
568	$0.00	$0.00
569	$0.00	$0.00
570	$0.00	$0.00
571	$0.00	$0.00
572	$0.00	$0.00
573	$0.00	$0.00
574	$0.00	$0.00
575	$0.00	$0.00
576	$0.00	$0.00
577	$0.00	$0.00
578	$0.00	$0.00
579	$0.00	$0.00
580	$0.00	$0.00
581	$0.00	$0.00
582	$0.00	$0.00
583	$0.00	$0.00
584	$0.00	$0.00
585	$0.00	$0.00
586	$0.00	$0.00
587	$0.00	$0.00
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595	$0.00	$0.00
596	$0.00	$0.00
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598	$0.00	$0.00
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614	$0.00	$0.00
615	$0.00	$0.00
616	$0.00	$0.00
617	$0.00	$0.00
618	$0.00	$0.00
619	$0.00	$0.00
620	$0.00	$0.00
621	$0.00	$0.00
622	$0.00	$0.00
623	$0.00	$0.00
624	$0.00	$0.00
625	$0.00	$0.00
626	$0.00	$0.00
627	$0.00	$0.00
628	$0.00	$0.00

629	$0.00	$0.00
630	$0.00	$0.00
631	$0.00	$0.00
632	$0.00	$0.00
633	$0.00	$0.00
634	$0.00	$0.00
635	$0.00	$0.00
636	$0.00	$0.00
637	$0.00	$0.00
638	$0.00	$0.00
639	$0.00	$0.00
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646	$0.00	$0.00
647	$0.00	$0.00
648	$0.00	$0.00
649	$0.00	$0.00
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660	$0.00	$0.00
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	663	$0.00	$0.00
	664	$0.00	$0.00
	665	$0.00	$0.00
	666	$0.00	$0.00
	667	$0.00	$0.00
	668	$0.00	$0.00
	669	$0.00	$0.00
	670	$0.00	$0.00
	671	$0.00	$0.00
	672	$0.00	$0.00
	673	$0.00	$0.00
	674	$0.00	$0.00
	675	$0.00	$0.00
	676	$0.00	$0.00
	677	$0.00	$0.00
	678	$0.00	$0.00
	679	$0.00	$0.00
	680	$0.00	$0.00
	681	$0.00	$0.00
	682	$0.00	$0.00
	683	$0.00	$0.00
	684	$0.00	$0.00
	685	$0.00	$0.00
	686	$0.00	$0.00
	687	$0.00	$0.00
	688	$0.00	$0.00
	689	$0.00	$0.00
	690	$0.00	$0.00
	691	$0.00	$0.00
	692	$0.00	$0.00
	693	$0.00	$0.00
	694	$0.00	$0.00
	695	$0.00	$0.00
	696	$0.00	$0.00

	697	$0.00	$0.00
	698	$0.00	$0.00
	699	$0.00	$0.00
	700	$0.00	$0.00
	701	$0.00	$0.00
	702	$0.00	$0.00
	703	$0.00	$0.00
	704	$0.00	$0.00
	705	$0.00	$0.00
	706	$0.00	$0.00
	707	$0.00	$0.00
	708	$0.00	$0.00
	709	$0.00	$0.00
	710	$0.00	$0.00
	711	$0.00	$0.00
	712	$0.00	$0.00
	713	$0.00	$0.00
	714	$0.00	$0.00
	715	$0.00	$0.00
	716	$0.00	$0.00
	717	$0.00	$0.00
	718	$0.00	$0.00
	719	$0.00	$0.00
	720	$0.00	$0.00
	721	$0.00	$0.00
	722	$0.00	$0.00
	723	$0.00	$0.00
	724	$0.00	$0.00
	725	$0.00	$0.00
	726	$0.00	$0.00
	727	$0.00	$0.00
	728	$0.00	$0.00
	729	$0.00	$0.00
	730	$0.00	$0.00

731	$0.00	$0.00	
732	$0.00	$0.00	

hodology for weekday only payments.
ıstration.

Holidays in 2019*	
1/1/2019	*New Year Day*
1/21/2019	*Martin Luther King Jr. Day*
2/18/2019	*Presidents Day*
5/27/2019	*Memorial Day*
7/4/2019	*Independence Day*
9/2/2019	*Labor Day*
10/14/2019	*Columbus Day*
11/11/2019	*Veterans Day*
11/28/2019	*Thanksgiving Day*
12/25/2019	*Christmas Day*

nt day. For the purpose of this illustration, we have

Source
User input (Section 1)
User input (Section 1)
Calculated (Section 2)
Calculated (Section 1)

Sum	0.00
Is sum zero (nearest cent)	Yes
Satisfies Reg Z	Yes

APR Approximation

This spreadsheet measures the impact on APR accuracy of using the more convenient RATE calculatior
The impact of this asusmption on accuracy is small, as you can see below.

Loan Terms	
Initial value	($1,000.00)
APR	300.00%
Start Date	31-Dec-18
Term (days)	365
Net work days	261
Daily Interest	0.82%
Daily Payment	$8.66
Average Weekday Payment	$12.10

	Calculations
Date	Weekday Amount
31-Dec-18	($1,000.00)
1-Jan-19	$12.10
2-Jan-19	$12.10
3-Jan-19	$12.10
4-Jan-19	$12.10
5-Jan-19	$0.00
6-Jan-19	$0.00
7-Jan-19	$12.10
8-Jan-19	$12.10
9-Jan-19	$12.10
10-Jan-19	$12.10
11-Jan-19	$12.10
12-Jan-19	$0.00
13-Jan-19	$0.00
14-Jan-19	$12.10
15-Jan-19	$12.10
16-Jan-19	$12.10
17-Jan-19	$12.10
18-Jan-19	$12.10
19-Jan-19	$0.00
20-Jan-19	$0.00
21-Jan-19	$12.10
22-Jan-19	$12.10
23-Jan-19	$12.10
24-Jan-19	$12.10
25-Jan-19	$12.10
26-Jan-19	$0.00

27-Jan-19	$0.00
28-Jan-19	$12.10
29-Jan-19	$12.10
30-Jan-19	$12.10
31-Jan-19	$12.10
1-Feb-19	$12.10
2-Feb-19	$0.00
3-Feb-19	$0.00
4-Feb-19	$12.10
5-Feb-19	$12.10
6-Feb-19	$12.10
7-Feb-19	$12.10
8-Feb-19	$12.10
9-Feb-19	$0.00
10-Feb-19	$0.00
11-Feb-19	$12.10
12-Feb-19	$12.10
13-Feb-19	$12.10
14-Feb-19	$12.10
15-Feb-19	$12.10
16-Feb-19	$0.00
17-Feb-19	$0.00
18-Feb-19	$12.10
19-Feb-19	$12.10
20-Feb-19	$12.10
21-Feb-19	$12.10
22-Feb-19	$12.10
23-Feb-19	$0.00
24-Feb-19	$0.00
25-Feb-19	$12.10
26-Feb-19	$12.10
27-Feb-19	$12.10
28-Feb-19	$12.10
1-Mar-19	$12.10
2-Mar-19	$0.00
3-Mar-19	$0.00
4-Mar-19	$12.10
5-Mar-19	$12.10
6-Mar-19	$12.10
7-Mar-19	$12.10
8-Mar-19	$12.10
9-Mar-19	$0.00
10-Mar-19	$0.00
11-Mar-19	$12.10
12-Mar-19	$12.10
13-Mar-19	$12.10
14-Mar-19	$12.10

15-Mar-19	$12.10
16-Mar-19	$0.00
17-Mar-19	$0.00
18-Mar-19	$12.10
19-Mar-19	$12.10
20-Mar-19	$12.10
21-Mar-19	$12.10
22-Mar-19	$12.10
23-Mar-19	$0.00
24-Mar-19	$0.00
25-Mar-19	$12.10
26-Mar-19	$12.10
27-Mar-19	$12.10
28-Mar-19	$12.10
29-Mar-19	$12.10
30-Mar-19	$0.00
31-Mar-19	$0.00
1-Apr-19	$12.10
2-Apr-19	$12.10
3-Apr-19	$12.10
4-Apr-19	$12.10
5-Apr-19	$12.10
6-Apr-19	$0.00
7-Apr-19	$0.00
8-Apr-19	$12.10
9-Apr-19	$12.10
10-Apr-19	$12.10
11-Apr-19	$12.10
12-Apr-19	$12.10
13-Apr-19	$0.00
14-Apr-19	$0.00
15-Apr-19	$12.10
16-Apr-19	$12.10
17-Apr-19	$12.10
18-Apr-19	$12.10
19-Apr-19	$12.10
20-Apr-19	$0.00
21-Apr-19	$0.00
22-Apr-19	$12.10
23-Apr-19	$12.10
24-Apr-19	$12.10
25-Apr-19	$12.10
26-Apr-19	$12.10
27-Apr-19	$0.00
28-Apr-19	$0.00
29-Apr-19	$12.10
30-Apr-19	$12.10

1-May-19	$12.10
2-May-19	$12.10
3-May-19	$12.10
4-May-19	$0.00
5-May-19	$0.00
6-May-19	$12.10
7-May-19	$12.10
8-May-19	$12.10
9-May-19	$12.10
10-May-19	$12.10
11-May-19	$0.00
12-May-19	$0.00
13-May-19	$12.10
14-May-19	$12.10
15-May-19	$12.10
16-May-19	$12.10
17-May-19	$12.10
18-May-19	$0.00
19-May-19	$0.00
20-May-19	$12.10
21-May-19	$12.10
22-May-19	$12.10
23-May-19	$12.10
24-May-19	$12.10
25-May-19	$0.00
26-May-19	$0.00
27-May-19	$12.10
28-May-19	$12.10
29-May-19	$12.10
30-May-19	$12.10
31-May-19	$12.10
1-Jun-19	$0.00
2-Jun-19	$0.00
3-Jun-19	$12.10
4-Jun-19	$12.10
5-Jun-19	$12.10
6-Jun-19	$12.10
7-Jun-19	$12.10
8-Jun-19	$0.00
9-Jun-19	$0.00
10-Jun-19	$12.10
11-Jun-19	$12.10
12-Jun-19	$12.10
13-Jun-19	$12.10
14-Jun-19	$12.10
15-Jun-19	$0.00
16-Jun-19	$0.00

17-Jun-19	$12.10
18-Jun-19	$12.10
19-Jun-19	$12.10
20-Jun-19	$12.10
21-Jun-19	$12.10
22-Jun-19	$0.00
23-Jun-19	$0.00
24-Jun-19	$12.10
25-Jun-19	$12.10
26-Jun-19	$12.10
27-Jun-19	$12.10
28-Jun-19	$12.10
29-Jun-19	$0.00
30-Jun-19	$0.00
1-Jul-19	$12.10
2-Jul-19	$12.10
3-Jul-19	$12.10
4-Jul-19	$12.10
5-Jul-19	$12.10
6-Jul-19	$0.00
7-Jul-19	$0.00
8-Jul-19	$12.10
9-Jul-19	$12.10
10-Jul-19	$12.10
11-Jul-19	$12.10
12-Jul-19	$12.10
13-Jul-19	$0.00
14-Jul-19	$0.00
15-Jul-19	$12.10
16-Jul-19	$12.10
17-Jul-19	$12.10
18-Jul-19	$12.10
19-Jul-19	$12.10
20-Jul-19	$0.00
21-Jul-19	$0.00
22-Jul-19	$12.10
23-Jul-19	$12.10
24-Jul-19	$12.10
25-Jul-19	$12.10
26-Jul-19	$12.10
27-Jul-19	$0.00
28-Jul-19	$0.00
29-Jul-19	$12.10
30-Jul-19	$12.10
31-Jul-19	$12.10
1-Aug-19	$12.10
2-Aug-19	$12.10

3-Aug-19	$0.00
4-Aug-19	$0.00
5-Aug-19	$12.10
6-Aug-19	$12.10
7-Aug-19	$12.10
8-Aug-19	$12.10
9-Aug-19	$12.10
10-Aug-19	$0.00
11-Aug-19	$0.00
12-Aug-19	$12.10
13-Aug-19	$12.10
14-Aug-19	$12.10
15-Aug-19	$12.10
16-Aug-19	$12.10
17-Aug-19	$0.00
18-Aug-19	$0.00
19-Aug-19	$12.10
20-Aug-19	$12.10
21-Aug-19	$12.10
22-Aug-19	$12.10
23-Aug-19	$12.10
24-Aug-19	$0.00
25-Aug-19	$0.00
26-Aug-19	$12.10
27-Aug-19	$12.10
28-Aug-19	$12.10
29-Aug-19	$12.10
30-Aug-19	$12.10
31-Aug-19	$0.00
1-Sep-19	$0.00
2-Sep-19	$12.10
3-Sep-19	$12.10
4-Sep-19	$12.10
5-Sep-19	$12.10
6-Sep-19	$12.10
7-Sep-19	$0.00
8-Sep-19	$0.00
9-Sep-19	$12.10
10-Sep-19	$12.10
11-Sep-19	$12.10
12-Sep-19	$12.10
13-Sep-19	$12.10
14-Sep-19	$0.00
15-Sep-19	$0.00
16-Sep-19	$12.10
17-Sep-19	$12.10
18-Sep-19	$12.10

19-Sep-19	$12.10
20-Sep-19	$12.10
21-Sep-19	$0.00
22-Sep-19	$0.00
23-Sep-19	$12.10
24-Sep-19	$12.10
25-Sep-19	$12.10
26-Sep-19	$12.10
27-Sep-19	$12.10
28-Sep-19	$0.00
29-Sep-19	$0.00
30-Sep-19	$12.10
1-Oct-19	$12.10
2-Oct-19	$12.10
3-Oct-19	$12.10
4-Oct-19	$12.10
5-Oct-19	$0.00
6-Oct-19	$0.00
7-Oct-19	$12.10
8-Oct-19	$12.10
9-Oct-19	$12.10
10-Oct-19	$12.10
11-Oct-19	$12.10
12-Oct-19	$0.00
13-Oct-19	$0.00
14-Oct-19	$12.10
15-Oct-19	$12.10
16-Oct-19	$12.10
17-Oct-19	$12.10
18-Oct-19	$12.10
19-Oct-19	$0.00
20-Oct-19	$0.00
21-Oct-19	$12.10
22-Oct-19	$12.10
23-Oct-19	$12.10
24-Oct-19	$12.10
25-Oct-19	$12.10
26-Oct-19	$0.00
27-Oct-19	$0.00
28-Oct-19	$12.10
29-Oct-19	$12.10
30-Oct-19	$12.10
31-Oct-19	$12.10
1-Nov-19	$12.10
2-Nov-19	$0.00
3-Nov-19	$0.00
4-Nov-19	$12.10

5-Nov-19	$12.10
6-Nov-19	$12.10
7-Nov-19	$12.10
8-Nov-19	$12.10
9-Nov-19	$0.00
10-Nov-19	$0.00
11-Nov-19	$12.10
12-Nov-19	$12.10
13-Nov-19	$12.10
14-Nov-19	$12.10
15-Nov-19	$12.10
16-Nov-19	$0.00
17-Nov-19	$0.00
18-Nov-19	$12.10
19-Nov-19	$12.10
20-Nov-19	$12.10
21-Nov-19	$12.10
22-Nov-19	$12.10
23-Nov-19	$0.00
24-Nov-19	$0.00
25-Nov-19	$12.10
26-Nov-19	$12.10
27-Nov-19	$12.10
28-Nov-19	$12.10
29-Nov-19	$12.10
30-Nov-19	$0.00
1-Dec-19	$0.00
2-Dec-19	$12.10
3-Dec-19	$12.10
4-Dec-19	$12.10
5-Dec-19	$12.10
6-Dec-19	$12.10
7-Dec-19	$0.00
8-Dec-19	$0.00
9-Dec-19	$12.10
10-Dec-19	$12.10
11-Dec-19	$12.10
12-Dec-19	$12.10
13-Dec-19	$12.10
14-Dec-19	$0.00
15-Dec-19	$0.00
16-Dec-19	$12.10
17-Dec-19	$12.10
18-Dec-19	$12.10
19-Dec-19	$12.10
20-Dec-19	$12.10
21-Dec-19	$0.00

22-Dec-19	$0.00
23-Dec-19	$12.10
24-Dec-19	$12.10
25-Dec-19	$12.10
26-Dec-19	$12.10
27-Dec-19	$12.10
28-Dec-19	$0.00
29-Dec-19	$0.00
30-Dec-19	$12.10
31-Dec-19	$12.10

ı for weekday-payment products, by assuming that 5 weekly payments are distributed equally

Results and Checks	
Total payment (Weekday)	$3,159.23
Total payment (Daily)	$3,159.23
APR (Daily, IRR)	300.00%
APR (Daily, XIRR)	300.00%
APR (Weekday, IRR)	301.43%
APR (Weekday, XIRR)	301.43%
Difference	-1.43%

Daily Amount	Sensitivity Ana	
	Estimated APR	RAPR
($1,000.00)	10%	10.02%
$8.66	20.0%	20.05%
$8.66	30.0%	30.07%
$8.66	40.0%	40.10%
$8.66	50.0%	50.12%
$8.66	60.0%	60.15%
$8.66	70.0%	70.18%
$8.66	80.0%	80.22%
$8.66	90.0%	90.25%
$8.66	100.0%	100.28%
$8.66	110.0%	110.32%
$8.66	120.0%	120.36%
$8.66	130.0%	130.40%
$8.66	140.0%	140.44%
$8.66	150.0%	150.49%
$8.66	160.0%	160.53%
$8.66	170.0%	170.58%
$8.66	180.0%	180.63%
$8.66	190.0%	190.68%
$8.66	200.0%	200.74%
$8.66	210.0%	210.80%
$8.66	220.0%	220.86%
$8.66	230.0%	230.92%
$8.66	240.0%	240.99%
$8.66	250.0%	251.05%
$8.66	260.0%	261.12%
$8.66	270.0%	271.20%

$8.66	280.0%	281.27%
$8.66	290.0%	291.35%
$8.66	300.0%	301.43%
$8.66	310.0%	311.52%
$8.66	320.0%	321.61%
$8.66	330.0%	331.70%
$8.66	340.0%	341.79%
$8.66	350.0%	351.89%
$8.66	360.0%	361.99%
$8.66	370.0%	372.09%
$8.66	380.0%	382.20%
$8.66	390.0%	392.31%
$8.66	400.0%	402.42%
$8.66	410.0%	412.53%
$8.66	420.0%	422.65%
$8.66	430.0%	432.78%
$8.66	440.0%	442.90%
$8.66	450.0%	453.03%
$8.66	460.0%	463.17%
$8.66	470.0%	473.30%
$8.66	480.0%	483.44%
$8.66	490.0%	493.59%
$8.66	500.0%	503.73%
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across the 7 days of the week.

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Point Difference	% Difference
-0.02%	-0.224%
-0.05%	-0.230%
-0.07%	-0.236%
-0.10%	-0.242%
-0.12%	-0.248%
-0.15%	-0.255%
-0.18%	-0.262%
-0.22%	-0.269%
-0.25%	-0.276%
-0.28%	-0.284%
-0.32%	-0.291%
-0.36%	-0.299%
-0.40%	-0.307%
-0.44%	-0.316%
-0.49%	-0.324%
-0.53%	-0.333%
-0.58%	-0.342%
-0.63%	-0.351%
-0.68%	-0.360%
-0.74%	-0.370%
-0.80%	-0.380%
-0.86%	-0.390%
-0.92%	-0.400%
-0.99%	-0.411%
-1.05%	-0.421%
-1.12%	-0.432%
-1.20%	-0.443%

-1.27%	-0.455%
-1.35%	-0.466%
-1.43%	-0.478%
-1.52%	-0.490%
-1.61%	-0.502%
-1.70%	-0.514%
-1.79%	-0.526%
-1.89%	-0.539%
-1.99%	-0.552%
-2.09%	-0.565%
-2.20%	-0.578%
-2.31%	-0.591%
-2.42%	-0.605%
-2.53%	-0.618%
-2.65%	-0.632%
-2.78%	-0.646%
-2.90%	-0.660%
-3.03%	-0.674%
-3.17%	-0.688%
-3.30%	-0.703%
-3.44%	-0.717%
-3.59%	-0.732%
-3.73%	-0.747%