



PREPAYMENT, REBATES, & REFUNDS

Understanding Refund Computations

October 2, 2019



Prevalent Refund Calculation Methods

- Rule of 78ths
- Actuarial Method
- Rule of Anticipation
- Pro-rata



When there is ambiguity or uncertainty concerning the specifics of any refund method, the underlying assumption should be:

Refund “it” in the same manner that it was earned.



This has long been the most popular method for refunding interest, credit insurance premiums, and many “other charges”.

- ✓ It is most often called “Rule of 78ths”
- ✓ and sometimes “Sum of the Digits”
- ✓ BUT the more appropriate title would be **DIRECT RATIO METHOD**



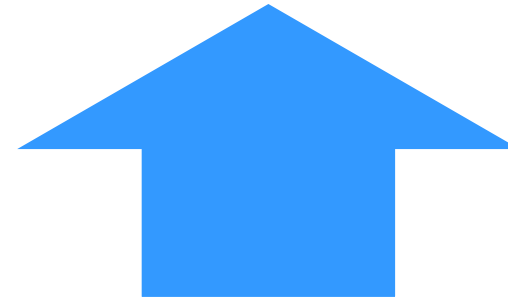
DIRECT RATIO METHOD

assumes that the portion of the total charge contained in each installment is computed as a direct ratio of:

the sum of the
number of
remaining unpaid
installments



to the sum of the
original number of
installments.



DIRECT RATIO METHOD

78												
77	66											
76	65	55										
75	64	54	45									
74	63	53	44	36								
73	62	52	43	35	28							
72	61	51	42	34	27	21						
71	60	50	41	33	26	20	15					
70	59	49	40	32	25	19	14	10				
69	58	48	39	31	24	18	13	9	6			
68	57	47	38	30	23	17	12	8	5	3		
67	56	46	37	29	22	16	11	7	4	2	1	

OF
PAYMENTS
OUTSTANDING

12 11 10 9 8 7 6 5 4 3 2 1

$$\sum \text{# of Payments Outstanding} = \frac{N(N+1)}{2} = \frac{12(13)}{2} = \frac{156}{2} = 78$$



While some statutes do reference the “Rule of 78ths”, or similar language, the historical definition has been something more like this:

“If prepayment in full occurs, the borrower shall be refunded or credited that proportion of the total precomputed charges which the sum of the monthly time balances scheduled to follow prepayment bears to the sum of all originally scheduled time balances”



A More All-Encompassing Label For This Method:

“Sum of the Balances”

- ✓ When all intervals in the credit transaction are “regular”
- ✓ “Rule of 78ths” and “Sum of the Balances” produce identical results.



Example Transaction:

- 12 Payments of \$225.35
- Amount Financed \$2,000.00
- Finance Charge \$704.20

- Prepaid in full as of the 6 scheduled payment



Payment No.	Total of Payments (Time Balances)	Remaining Time Balances	Payment Amount
1	\$2,704.20		\$225.35
2	\$2,478.85		\$225.35
3	\$2,253.50		\$225.35
4	\$2,028.15		\$225.35
5	\$1,802.80		\$225.35
6	\$1,577.45	PREPAYMENT	\$225.35
7	\$1,352.10	\$1,352.10	\$225.35
8	\$1,126.75	\$1,126.75	\$225.35
9	\$901.40	\$901.40	\$225.35
10	\$676.05	\$676.05	\$225.35
11	\$450.70	\$450.70	\$225.35
12	\$225.35	\$225.35	\$225.35
	\$17,577.30	\$4,732.35	
	Sum of Original Balances	Sum of Remaining Balances	



Sum of the Balances

Sum Remaining \$4,732.35
Sum of Original \$17,577.30

Refund Percentage
.269230769

Rule of 78ths

Sum Remaining 21
Sum of Original 78

Refund Percentage
.269230769



Example Transaction:

- ✓ Time to First Payment: 3 Months
- ✓ Number of Payments: 12
- ✓ Payment: \$246.44
- ✓ Amount Financed: \$2,000.00
- ✓ Finance Charge: \$957.28
- ✓ Prepaid in full: as of the 6 scheduled payment



Month No.	Payment No.	Total of Payments (Time Balances)	Remaining Time Balances	Payment Amount
1	-	\$2,957.28		
2	-	\$2,957.28		
3	1	\$2,957.28		\$246.44
4	2	\$2,710.84		\$246.44
5	3	\$2,464.40		\$246.44
6	4	\$2,217.96		\$246.44
7	5	\$1,971.52		\$246.44
8	6	\$1,725.08	PREPAYMENT	\$246.44
9	7	\$1,478.64	\$1,478.64	\$246.44
10	8	\$1,232.20	\$1,232.20	\$246.44
11	9	\$985.76	\$985.76	\$246.44
12	10	\$739.32	\$739.32	\$246.44
13	11	\$492.88	\$492.88	\$246.44
14	12	\$246.44	\$246.44	\$246.44
		\$25,136.88	\$5,175.24	
		Sum of Original Balances	Sum of Remaining Balances	



Sum of the Balances

Sum Remaining \$5,175.24

Sum of Original \$25,136.88

Refund Percentage

.205882352

Rule of 78ths

Pmts Sum Remaining 21

Pmts Sum of Original 78

Or

Mos. Sum Remaining 36

Mos. Sum of Orig. 105

Pmts Pct. .269230769

Mos. Pct. .342857142



Balloon Payment Transactions...

...Or transactions with unequal payment amounts, produce different results when refunded by the “Sum of the Balances” rather than Rule of 78ths.

- ✓ Large payments due at the end of the contract will affect the amount of the rebate.
- ✓ More often than not, the difference will be in the borrower’s favor.



Balloon Payments

Payment No.	Total of Payments (Time Balances)	Remaining Time Balances	Payment Amount
1	\$5,450.97		\$268.27
2	\$5,182.70		\$268.27
3	\$4,914.43		\$268.27
4	\$4,646.16		\$268.27
5	\$4,377.89		\$268.27
6	\$4,109.62	PREPAYMENT	\$268.27
7	\$3,841.35	\$3,841.35	\$268.27
8	\$3,573.08	\$3,573.08	\$268.27
9	\$3,304.81	\$3,304.81	\$268.27
10	\$3,036.54	\$3,036.54	\$268.27
11	\$2,768.27	\$2,768.27	\$268.27
12	\$2,500.00	\$2,500.00	\$2,500.00
	\$0.00		
	\$47,705.82	\$19,024.05	
	Sum of Original Balances	Sum of Remaining Balances	



Balloon Payments

Sum of the Balances

Sum Remaining \$19,024.05

Sum of Original \$47,705.82

Refund Percentage

.398778388

Rule of 78ths

Sum Remaining 21

Sum of Original 78

Refund Percentage

.269230769



The “Actuarial Method” is probably the most prevalent of the methods in use today. It is also the most elusive to clearly define.

THE MOST COMMON DEFINITION:

The method of allocating payments made on a debt between the amount financed and the finance charge pursuant to which a payment is applied first to the accumulated finance charge and any remainder is subtracted from, or any deficiency is added to, the outstanding balance of the amount financed.



Pmt No.	Payment Amount	Beginning Balance of Amount Financed	Accrued Interest	Principal Allocation	Ending Balance of Amount Financed
1	\$444.24	\$5,000.00	\$50.00	\$394.24	\$4,605.76
2	\$444.24	\$4,605.76	\$46.06	\$398.18	\$4,207.58
3	\$444.24	\$4,207.58	\$42.08	\$402.16	\$3,805.42
4	\$444.24	\$3,805.42	\$38.05	\$406.19	\$3,399.23
5	\$444.24	\$3,399.23	\$33.99	\$410.25	\$2,988.98
6	\$444.24	\$2,988.98	\$29.89	\$414.35	\$2,574.63
7	\$444.24	\$2,574.63	\$25.75	\$418.49	\$2,156.14
8	\$444.24	\$2,156.14	\$21.56	\$422.68	\$1,733.46
9	\$444.24	\$1,733.46	\$17.33	\$426.91	\$1,306.55
10	\$444.24	\$1,306.55	\$13.07	\$431.17	\$875.38
11	\$444.24	\$875.38	\$8.75	\$435.49	\$439.89
12	\$444.24	\$439.89	\$4.40	\$439.84	\$0.05



Pmt No.	Payment Amount	Beginning Balance of Amount Financed	Accrued Interest	Principal Allocation	Ending Balance of Amount Financed
1	\$444.24	\$5,000.00	\$50.00	\$394.24	\$4,605.76
2	\$444.24	\$4,605.76	\$46.06	\$398.18	\$4,207.58
3	\$444.24	\$4,207.58	\$42.08	\$402.16	\$3,805.42
4	\$444.24	\$3,805.42	\$38.05	\$406.19	\$3,399.23
5	\$444.24	\$3,399.23	\$33.99	\$410.25	\$2,988.98
6	\$444.24	\$2,988.98	\$29.89	\$414.35	\$2,574.63
7	\$444.24	\$2,574.63	\$25.75	\$418.49	\$2,156.14
8	\$444.24	\$2,156.14	\$21.56	\$422.68	\$1,733.46
9	\$444.24	\$1,733.46	\$17.33	\$426.91	\$1,306.55
10	\$444.24	\$1,306.55	\$13.07	\$431.17	\$875.38
11	\$444.24	\$875.38	\$8.75	\$435.49	\$439.89
12	\$444.24	\$439.89	\$4.40	\$439.84	\$0.05
			\$90.86		
			REFUND		



Net Payoff Life Premiums

To that basic example transaction, we will add a net payoff credit life premium.

- ✓ **Life Rate:** \$1.00 mo. / per \$1000
- ✓ **Premium:** \$33.31
- ✓ **Principal/Death Benefit:** \$5,033.31
- ✓ **Payment:** \$447.20
- ✓ **Interest Rate:** 12%



Net Payoff Life Premium

Principal \$5,033.31

12 monthly Payments

12%

Payment \$447.20

Life \$1.00/\$1,000 mo.

Payment Number	Accrued Interest	Premium Balance	Principal Balance
1	\$50.33	\$5.03	\$4,636.44
2	\$46.36	\$4.64	\$4,235.60
3	\$42.36	\$4.24	\$3,830.76
4	\$38.31	\$3.83	\$3,421.87
5	\$34.22	\$3.42	\$3,008.89
6	\$30.09	\$3.01	\$2,591.78
7	\$25.92	\$2.59	\$2,170.50
8	\$21.71	\$2.17	\$1,745.01
9	\$17.45	\$1.75	\$1,315.26
10	\$13.15	\$1.32	\$881.21
11	\$8.81	\$0.88	\$442.82
12	\$4.43	\$0.44	\$0.05
	\$333.14	\$33.32	



How to refund a flat dollar charge by the “Actuarial Method”??

For example, insert a \$200 flat charge for a debt cancellation contract. The DCC must be refunded by a method *at least as favorable to the consumer as the Actuarial Method*.



Pmt No.	Payment Amount	Beginning Balance of Amount Financed	Accrued Interest	Principal Allocation	Ending Balance of Amount Financed
1	\$462.01	\$5,200.00	\$52.00	\$410.01	\$4,789.99
2	\$462.01	\$4,789.99	\$47.90	\$414.11	\$4,375.88
3	\$462.01	\$4,375.88	\$43.76	\$418.25	\$3,957.63
4	\$462.01	\$3,975.63	\$39.58	\$422.43	\$3,535.20
5	\$462.01	\$3,535.20	\$35.35	\$426.66	\$3,108.54
6	\$462.01	\$3,108.54	\$31.09	\$430.92	\$2,677.62
7	\$462.01	\$2,677.62	\$26.78	\$435.23	\$2,242.39
8	\$462.01	\$2,242.39	\$22.42	\$439.59	\$1,802.80
9	\$462.01	\$1,802.80	\$18.03	\$443.98	\$1,358.82
10	\$462.01	\$1,358.82	\$13.59	\$448.42	\$910.40
11	\$462.01	\$910.40	\$9.10	\$452.91	\$457.49
12	\$462.01	\$457.49	\$4.57	\$457.44	\$0.05



Pmt No.	Payment Amount	Beginning Balance of Amount Financed	Accrued Interest	Debt Cancellation Charge	Principal Allocation	Ending Balance of Amount Financed
1	\$462.01	\$5,200.00	\$52.00	\$30.22	\$410.01	\$4,789.99
2	\$462.01	\$4,789.99	\$47.90	\$27.84	\$414.11	\$4,375.88
3	\$462.01	\$4,375.88	\$43.76	\$25.43	\$418.25	\$3,957.63
4	\$462.01	\$3,975.63	\$39.58	\$23.00	\$422.43	\$3,535.20
5	\$462.01	\$3,535.20	\$35.35	\$20.55	\$426.66	\$3,108.54
6	\$462.01	\$3,108.54	\$31.09	\$18.07	\$430.92	\$2,677.62
7	\$462.01	\$2,677.62	\$26.78	\$15.56	\$435.23	\$2,242.39
8	\$462.01	\$2,242.39	\$22.42	\$13.03	\$439.59	\$1,802.80
9	\$462.01	\$1,802.80	\$18.03	\$10.48	\$443.98	\$1,358.82
10	\$462.01	\$1,358.82	\$13.59	\$7.90	\$448.42	\$910.40
11	\$462.01	\$910.40	\$9.10	\$5.29	\$452.91	\$457.49
12	\$462.01	\$457.49	\$4.57	\$2.63	\$457.44	\$0.05
			\$344.12	\$200.00		
				DCC Charge		
				\$54.89		
				DCC Refund		



To refund a flat dollar amount by the Actuarial Method:

The calculation maintains the relationship of the earned actuarial interest charge to the total charge and applies the same ration to the DCC charge.

For example, the first month's interest is \$52:

$$✓ \$52.00 / \$344.12 = .15111 \text{ (pct of total interest)}$$

$$✓ .15111 \times \$200 = \$30.22$$



“Odd Days”

Using the \$5,000 example from earlier:

- ✓ Contract Date: 5/09/06
- ✓ First payment: 6/24/06
- ✓ **15 “odd days”**
- ✓ The **profile of interest** looks something like this,



“Odd Days”

Principal \$5,000.00

12 monthly Payments

12%

Payment \$446.41

Payment Number	Accrued Interest	Premium Balance	Principal Balance
1	\$74.66	\$24.66	\$4,628.25
2	\$46.28	\$46.28	\$4,228.12
3	\$42.28	\$42.28	\$3,823.99
4	\$38.24	\$38.24	\$3,415.82
5	\$34.16	\$34.16	\$3,003.57
6	\$30.04	\$30.04	\$2,587.20
7	\$25.87	\$25.87	\$2,166.66
8	\$21.67	\$21.67	\$1,741.92
9	\$17.42	\$17.42	\$1,312.93
10	\$13.13	\$13.13	\$879.65
11	\$8.80	\$8.80	\$442.04
12	\$4.42	\$4.42	\$0.05
	\$	\$	



“Odd Days”

The remaining 6 accrued interest balances:

- \$25.87
- \$21.67
- \$17.42
- \$13.13
- \$ 8.80
- \$ 4.42

\$ 91.31



“Odd Days”

Using the “generic” 12% refund factor of .274601 will produce the following:

$$.274601 \times \$356.92 = \$98.01$$

The correct refund factor is .255827



The Rule of Anticipation

The “**Rule of Anticipation**” is an actuarial refund in most cases. The idea is to refund as though a new transaction were being created from the time of prepayment in full until the originally scheduled maturity date. This method is widely used in refund credit insurance premiums. Since scheduled amounts and balances are used in the refund process, ROA will often produce identical values to an actuarial refund.



The Rule of Anticipation

The Scheduled Balance after the 6th payment was to be made is \$2,591.78. So, the data for the “new transaction is as follows:

- ✓ Amount Financed: \$2,591.78
- ✓ Interest Rate: 12%
- ✓ Remaining Payments: 6 Payments (remaining)
- ✓ Payment: \$447.20
- ✓ Life Rate: \$1.00 per month per \$1000



Net Payoff Life Premium

Principal \$5,033.31

12 monthly Payments

12%

Payment \$447.20

Life \$1.00/\$1,000 mo.

Payment Number	Accrued Interest	Premium Balance	Principal Balance
1	\$50.33	\$5.03	\$4,636.44
2	\$46.36	\$4.64	\$4,235.60
3	\$42.36	\$4.24	\$3,830.76
4	\$38.31	\$3.83	\$3,421.87
5	\$34.22	\$3.42	\$3,008.89
6	\$30.09	\$3.01	\$2,591.78
7	\$25.92	\$2.59	\$2,170.50
8	\$21.71	\$2.17	\$1,745.01
9	\$17.45	\$1.75	\$1,315.26
10	\$13.15	\$1.32	\$881.21
11	\$8.81	\$0.88	\$442.82
12	\$4.43	\$0.44	\$0.05
	\$333.14	\$33.32	



The Rule of Anticipation

The scheduled earned premiums
“below” the line representing payoff are:

\$2.59

\$2.17

\$1.75

\$1.32

\$.88

\$.44

\$9.15 Refund



The Rule of Anticipation

Principal \$2,591.78

6 monthly Payments

12%

Payment \$447.20

Payment Number	Accrued Interest	Premium Balance	Principal Balance
1	\$25.92	\$2.59	\$2,170.50
2	\$21.71	\$2.17	\$1,745.01
3	\$17.45	\$1.75	\$1,315.26
4	\$13.15	\$1.32	\$881.21
5	\$8.81	\$0.88	\$442.82
6	\$4.43	\$0.44	\$0.05
	\$91.47	\$9.15	