

EFFECTIVE INTEREST CALCULATION MODELS
(Appendix to Sec. 305 on Method of Computing Interest)

Illustration 1

EFFECTIVE INTEREST CALCULATION MODEL
FIXED EQUAL AMORTIZATION CASE

	A	B	C	D	E	F	G
1	Loan Amount		120,000.00				
2	Monthly Installment		11,001.60				
3	Contractual Rate (Monthly)		1.50%				
4	Other Charges		3.00%				
5	No. of Monthly Installment		12				
6							
7	Installment	Gross			Other		O/S
8	Period	Loan	Principal	Interest	Charges	Cash flows	Balance
9		120,000.00					120,000.00
10	0				3,600.00	116,400.00	120,000.00
11	1		9,201.60	1,800.00		(11,001.60)	110,798.40
12	2		9,339.62	1,661.98		(11,001.60)	101,458.78
13	3		9,479.72	1,521.88		(11,001.60)	91,979.06
14	4		9,621.91	1,379.69		(11,001.60)	82,357.15
15	5		9,766.24	1,235.36		(11,001.60)	72,590.91
16	6		9,912.74	1,088.86		(11,001.60)	62,678.17
17	7		10,061.43	940.17		(11,001.60)	52,616.74
18	8		10,212.35	789.25		(11,001.60)	42,404.39
19	9		10,365.53	636.07		(11,001.60)	32,038.86
20	10		10,521.02	480.58		(11,001.60)	21,517.85
21	11		10,678.83	322.77		(11,001.60)	10,839.01
22	12		10,839.01	162.59		(11,001.60)	-
23		TOTAL	120,000.00	12,019.20	3,600.00		

Monthly Installment	=	$PMT(C3, C5, -C1)^{-1}$	<u>11,001.60</u>
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(using Excel PMT Function)

Effective Annual Interest Rate (EIR)	=	$(1+IRR(F10:F22))^{12}-1$	26.71%
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(using Excel IRR Function)

Effective Monthly Interest Rate (MIR) = IRR (F10:F22)

1.99%

(using Excel IRR Function)

Illustration 2

**EFFECTIVE INTEREST CALCULATION MODEL
FIXED PRINCIPAL AMORTIZATION CASE**

	A	B	C	D	E	F	G
1	Loan Amount		120,000.00				
2	Monthly Installment		11,001.60				
3	Contractual Rate (Monthly)		1.50%				
4	Other Charges		3.00%				
5	No. of Monthly Installment		12				
6							
7	Installment	Gross			Other		O/S
8	Period	Loan	Principal	Interest	Charges	Cash flows	Balance
9		120,000.00					120,000.00
10	0				3,600.00	116,400.00	120,000.00
11	1		10,000	1,800.00		(11,800.00)	110,000.00
12	2		10,000	1,661.98		(11,650.00)	100,000.00
13	3		10,000	1,500.00		(11,500.00)	90,000.00
14	4		10,000	1,350.00		(11,350.00)	80,000.00
15	5		10,000	1,200.00		(11,200.00)	70,000.00
16	6		10,000	1,050.00		(11,050.00)	60,000.00
17	7		10,000	900.00		(10,900.00)	50,000.00
18	8		10,000	750.00		(10,750.00)	40,000.00
19	9		10,000	600.00		(10,600.00)	30,000.00
20	10		10,000	450.00		(10,450.00)	20,000.00
21	11		10,000	300.00		(10,300.00)	10,000.00
22	12		10,000	150.00		(10,150.00)	-
23		TOTAL	120,000.00	11,700.00	3,600.00		

Effective Annual Interest Rate (EIR) = $(1 + \text{IRR (F10:F22)})^{12} - 1$

26.91%

(using Excel IRR Function)

Effective Monthly Interest Rate (MIR) = IRR (F10:F22)

2.01%

(using Excel IRR Function)

Illustration 3

EFFECTIVE INTEREST CALCULATION MODEL FIXED EQUAL AMORTIZATION CASE WITH GRACE PERIOD

	A	B	C	D	E	F	G
1	Loan Amount		120,000.00				
2	Monthly Installment		11,001.60				
3	Contractual Rate (Monthly)		1.50%				
4	Other Charges		3.00%				
5	No. of Monthly Installment		12				
6	<i>(2 months grace period on principal and interest payments)</i>						
7	Installment	Gross			Other		O/S
8	<u>Period</u>	<u>Loan</u>	<u>Principal</u>	<u>Interest</u>	<u>Charges</u>	<u>Cash flows</u>	<u>Balance</u>
9		120,000.00					120,000.00
10	0				3,600.00	116,400.00	120,000.00
11	1					-	120,000.00
12	2					-	120,000.00
13	3		9,201.60	1,800.00		(11,001.60)	110,798.40
14	4		9,339.62	1,661.98		(11,001.60)	101,458.78
15	5		9,479.72	1,521.88		(11,001.60)	91,979.06
16	6		9,621.91	1,379.69		(11,001.60)	82,357.15
17	7		9,766.24	1,235.36		(11,001.60)	72,590.91
18	8		9,912.74	1,088.86		(11,001.60)	62,678.17
19	9		10,061.43	940.17		(11,001.60)	52,616.74
20	10		10,212.35	789.25		(11,001.60)	42,404.39
21	11		10,365.53	636.07		(11,001.60)	32,038.86
22	12		10,521.02	480.58		(11,001.60)	21,517.85
23	13		10,678.83	322.77		(11,001.60)	10,839.01
24	14		10,839.01	162.59		(11,001.60)	(0.00)
25		TOTAL	120,000.00	12,019.20	3,600.00		

Monthly Installment = PMT (C3, C5, -C1)*-1

11,001.60

(using Excel PMT Function)

$$\text{Effective Annual Interest Rate (EIR)} = (1 + \text{IRR (F10:F24)})^{12} - 1$$

19.68%

(using Excel IRR Function)

$$\text{Effective Monthly Interest Rate (MIR)} = \text{IRR (F10:F24)}$$

1.51%

(using Excel IRR Function)

Illustration 4

EFFECTIVE INTEREST CALCULATION MODEL
CASE: PERIODIC INTEREST PAYMENT, BALLOON PAYMENT AT MATURITY

	A	B	C	D	E	F	G
1	Loan Amount		120,000.00				
2	Monthly Installment		1,800.00 <i>(Interest Only)</i>				
3	Contractual Rate (Monthly)		1.50%				
4	Other Charges		3.00%				
5	No. of Monthly Installment		12				
6							
7	Installment	Gross			Other		O/S
8	Period	Loan	Principal	Interest	Charges	Cash flows	Balance
9		120,000.00					120,000.00
10	0				3,600.00	116,400.00	120,000.00
11	1			1,800.00		(11,800.00)	120,000.00
12	2			1,800.00		(11,800.00)	120,000.00
13	3			1,800.00		(11,800.00)	120,000.00
14	4			1,800.00		(11,800.00)	120,000.00
15	5			1,800.00		(11,800.00)	120,000.00
16	6			1,800.00		(11,800.00)	120,000.00
17	7			1,800.00		(11,800.00)	120,000.00
18	8			1,800.00		(11,800.00)	120,000.00
19	9			1,800.00		(11,800.00)	120,000.00
20	10			1,800.00		(11,800.00)	120,000.00
21	11			1,800.00		(11,800.00)	120,000.00
22	12		120,000.00	1,800.00		(121,800.00)	-
23		TOTAL	120,000.00	21,600.00	3,600.00		

$$\begin{aligned} \text{Effective Annual Interest Rate (EIR)} &= (1 + \text{IRR (F10:F22)})^{12} - 1 = \boxed{23.58\%} \\ \text{(using Excel IRR Function)} & \\ \text{Effective Monthly Interest Rate (MIR)} &= \text{IRR (F10:F22)} = \boxed{1.78\%} \\ \text{(using Excel IRR Function)} & \end{aligned}$$

Illustration 5

EFFECTIVE INTEREST CALCULATION MODEL
FIXED EQUAL AMORTIZATION CASE
(WEEKLY INSTALLMENTS QUOTED IN MONTHLY EFFECTIVE RATE)

	A	B	C	D	E	F	G
1	Loan Amount		10,000.00				
2	Monthly Installment		788.00				
3	Contractual Rate (Monthly)		1.50%				
4	Weekly Compounding Rate		0.35%				
5	Other Charges		3.00%				
6	Term (Weeks)		13				
7	Period/Year		52				
8	Installment	Gross			Other		O/S
9	Period	Loan	Principal	Interest	Charges	Cash flows	Balance
10							10,000.00
11	0				300.00	9,700.00	10,000.00
12	1		753.38	34.62		-	9,246.62
13	2		755.99	32.01		(788.00)	8,490.63
14	3		758.61	29.39		(788.00)	7,732.02
15	4		761.23	26.76		(788.00)	6,970.78
16	5		763.87	24.13		(788.00)	6,206.91
17	6		766.51	21.49		(788.00)	5,440.40
18	7		769.17	18.83		(788.00)	4,671.24
19	8		771.83	16.17		(788.00)	3,899.41
20	9		774.50	13.50		(788.00)	3,124.91
21	10		777.18	10.82		(788.00)	2,347.72
22	11		779.87	8.13		(788.00)	1,567.85
23	12		782.57	5.43		(788.00)	785.28
24	13		785.28	2.72		(788.00)	(0.00)

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TOTAL	10,000.00	244.00	300.00
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Weekly Installment = $\text{PMT}(C4, C6, -C1)^{-1}$

(using Excel PMT Function)

Effective Annual Interest Rate (EIR) = $(1 + \text{IRR}(F10:F24))^{52} - 1$

50.46%

(using Excel IRR Function)

Effective Monthly Interest Rate (MIR) = $(1 + \text{IRR}(F11:F24))^{13/3} - 1$

3.46%

(using Excel IRR Function)