Chapter 3 – Time value of Money

This chapter discusses how to calculate the present value, future value, internal rate of return, and modified internal rate of return of a cash flow stream. Understanding how (and when) to use these formulas is essential to your success as a financial manager! Formulas and examples are included with these notes.

Numbers are rounded to 4 decimal places in tables and formula. However, the actual (non-rounded) numbers are used in the calculations.

Time Value of Money Concepts

1. **Time-Line Conventions**

   A. $1 received today (cash inflow)
   B. $1 paid in five years (cash outflow)
   C. $1 received at the end of the third year
   D. $1 received at the beginning of the third year
   E. Four-year annuity of $1 per year, first cash flow received at t = 1 (ordinary annuity)
   F. Four-year annuity of $1 per year, first cash flow received at t = 0 (annuity due)
   G. Four-year annuity of $1 per year, first cash flow received at t = 2 (deferred annuity)

	0	1	2	3	4	5
A.	$1					
B.						-$1
C.				$1		
D.			$1			
E.		$1	$1	$1	$1	
F.	$1	$1	$1	$1		
G.			$1	$1	$1	$1

2. **Notation**

   C_0 = cash flow at time 0
   C = cash flow (used when all cash flows are the same)
   r = discount rate or interest rate
   t = time period (e.g., t = 4), or number of years (e.g., t years in the future)
   m = number of compounding periods per year (e.g., with monthly compounding, m = 12)
   g = growth rate in cash flow

3. **Annual Compounding, Single Payments**

   A. Future value of $1 as of time 1. Interest rate = 5%.

0	1	2	3	4	5
$1	$0	$0	$0	$0	$0

Formula: $C_0 (1 + r)^t = \$1(1.05)^1 = \$1.0500$
Financial Calculator: N = 1, I/Y = 5, PV = -1, PMT = 0, FV = Answer

Note on financial calculators – The calculator inputs described above are for a Texas Instruments BAII Plus calculator. (Many other financial calculators require similar inputs.)

Notice that you enter a -1 as the PV and the solution is +1.05. Here is the intuition: deposit $1 in the bank (negative cash flow), withdraw $1.05 in one year (positive cash flow). If you had entered +1 as the PV, the solution would be –1.05.

B. Future value of $1, as of time 5. Interest rate = 5%.

0	1	2	3	4	5
$1	$0	$0	$0	$0	$0

Formula: $C_0 (1 + r)^t = \$1(1.05)^5 = \$1.2763$
Financial Calculator: N = 5, I/Y = 5, PV = -1, PMT = 0, FV = Answer

C. Present value of $1, received at time 1. Discount rate = 5%.

0	1	2	3	4	5
$0	$1	$0	$0	$0	$0

Formula: $C_1 / (1 + r)^t = \$1/(1.05)^1 = \$0.9524$
Financial Calculator: N = 1, I/Y = 5, PV = Answer, PMT = 0, FV = -1

D. Present value of $1, received at time 5. Discount rate = 5%.

0	1	2	3	4	5
$0	$0	$0	$0	$0	$1

Formula: $C_5 / (1 + r)^t = \$1/(1.05)^5 = \$0.7835$
Financial Calculator: N = 5, I/Y = 5, PV = Answer, PMT = 0, FV = -1

4. **Compounding periods less than one year**

A. Future value of $1, as of time 5. Interest rate = 5%, compounded "m" times per year.

0	1	2	3	4	5
$1	$0	$0	$0	$0	$0

General (non-continuous) formula: $C_0 (1 + r/m)^{tm}$
Continuous compounding formula: $C_0 e^{rt}$
Note: "e" = 2.718281828

Semi-annual compounding: $\$1(1 + (0.05/2))^{(5)(2)} = \$1.280085$
Monthly compounding: $\$1(1 + (0.05/12))^{(5)(12)} = \$1.283359$
Daily compounding: $\$1(1 + (0.05/365))^{(5)(365)} = \$1.284003$
Continuous compounding: $\$1\ e^{(5)(0.05)} = \$1.284025$

Note: Some may use 360 days as the length of one year, other may take into account leap years (366 days every four years). The effects of these changes (from a 365-day year) are extremely small.

Financial Calculator (for semi-annual): N = 10, I/Y = 5/2, PV = -1, PMT = 0, FV = Answer
Financial Calculator (for monthly): N = 60, I/Y = 5/12, PV = -1, PMT = 0, FV = Answer
Financial Calculator (for daily): N = 1825, I/Y = 5/365, PV = -1, PMT = 0, FV = Answer

B. Present value of $1, received at time 5. Discount rate = 5%, compounded m times per year.

0	1	2	3	4	5
$0	$0	$0	$0	$0	$1

General (non-continuous) formula: $C_5 / (1 + r/m)^{tm}$
Continuous compounding formula: C_5 / e^{rt}

Semi-annual compounding: $\$1 / [1 + (0.05/2)]^{(5)(2)} = \$0.781198$
Monthly compounding: $\$1 / [1 + (0.05/12)]^{(5)(12)} = \$0.779205$
Daily compounding: $\$1 / [1 + (0.05/365)]^{(5)(365)} = \$0.778814$
Continuous compounding: $\$1 / e^{(5)(0.05)} = \$0.778801$

Financial Calculator (for semi-annual): N = 10, I/Y = 5/2, PV = Answer, PMT = 0, FV = -1
Financial Calculator (for monthly): N = 60, I/Y = 5/12, PV = Answer, PMT = 0, FV = -1
Financial Calculator (for daily): N = 1825, I/Y = 5/365, PV = Answer, PMT = 0, FV = -1

5. **Constant Finite Annuities**

A. Four-year annuity of $1 per year, first cash flow received at t = 1. Interest and discount rate = 5%.

0	1	2	3	4	5
$0	$1	$1	$1	$1	$0

Standard formula for the *future value of a finite annuity* = $C [(1 + r)^t – 1] / r$

This standard formula for the *future value of a finite annuity* gives a value as of the last period of the annuity (time 4 in this example). The 1.05 is raised to the fourth power because there are 4 payments in the annuity.

Value as of time 4 = $\$1 [(1.05^4 – 1) / 0.05] =$	$4.3101

You can calculate the value of the cash flows at other points in time by multiplying or dividing by 1+r, where r (the interest and discount rate) is 5% in this example.

For instance, assume you want to know the value of the above cash flow stream at t = 6. Time 6 is two years after time 4. To calculate, use the standard formula to determine the value at t = 4, then <u>multiply</u> by 1.05^2 to determine the value at t = 6. (Use the second power because you are calculating the value two years after time 4.) The solution is:

Value as of time 6 = $\$1 [(1.05^4 – 1) / 0.05] \, 1.05^2 =$	$4.7519

As a second example, assume that you want to know the value of the above cash flow stream at t = 1. Time 1 is three years before time 4. To calculate, use the standard formula to determine the value at t = 4, then <u>divide</u> by 1.05^3 to determine the value at t = 1. (Use the third power because you are calculating the value three years before time 4.) The solution is:

Value as of time 1 = $\$1 [(1.05^4 – 1) / 0.05] / 1.05^3 =$	$3.7232

Therefore, “multiply” when you want to determine the value at a later date, “divide” when you want to determine the value at an earlier date.

Some more examples:

Value as of time 0 = $\$1 [(1.05^4 – 1) / 0.05] / 1.05^4 =$	$3.5460
Value as of time 1 = $\$1 [(1.05^4 – 1) / 0.05] / 1.05^3 =$	$3.7232
Value as of time 2 = $\$1 [(1.05^4 – 1) / 0.05] / 1.05^2 =$	$3.9094
Value as of time 3 = $\$1 [(1.05^4 – 1) / 0.05] / 1.05^1 =$	$4.1049
Value as of time 4 = $\$1 [(1.05^4 – 1) / 0.05] =$	$4.3101
Value as of time 5 = $\$1 [(1.05^4 – 1) / 0.05] \, 1.05^1 =$	$4.5256
Value as of time 6 = $\$1 [(1.05^4 – 1) / 0.05] \, 1.05^2 =$	$4.7519
Value as of time 7 = $\$1 [(1.05^4 – 1) / 0.05] \, 1.05^3 =$	$4.9895

Financial Calculator (time 0): N = 4, I/Y = 5, PV = 0, PMT = -1, FV = Answer. Divide answer by 1.05^4.
Financial Calculator (time 1): N = 4, I/Y = 5, PV = 0, PMT = -1, FV = Answer. Divide answer by 1.05^3.
Financial Calculator (time 2): N = 4, I/Y = 5, PV = 0, PMT = -1, FV = Answer. Divide answer by 1.05^2.
Financial Calculator (time 3): N = 4, I/Y = 5, PV = 0, PMT = -1, FV = Answer. Divide answer by 1.05^1.
Financial Calculator (time 4): N = 4, I/Y = 5, PV = 0, PMT = -1, FV = Answer.
Financial Calculator (time 5): N = 4, I/Y = 5, PV = 0, PMT = -1, FV = Answer. Multiply answer by 1.05^1.
Financial Calculator (time 6): N = 4, I/Y = 5, PV = 0, PMT = -1, FV = Answer. Multiply answer by 1.05^2
Financial Calculator (time 7): N = 4, I/Y = 5, PV = 0, PMT = -1, FV = Answer. Multiply answer by 1.05^3

You can also use the formula for the *present value of a finite annuity* to calculate the value of a cash flow stream at different points in time.

Standard formula for the *present value of a finite annuity* = $C \{ [1 – (1 / (1 + r))^t] / r\}$

The standard formula gives a value one period before the first payment of the annuity (time 0 in this example). The 1.05 is raised to the fourth power because there are 4 payments in the annuity.

Value as of time 0 = $\$1 \{ [1 – (1/1.05)^4] / (0.05) \}$ =	$3.5460

As before, you can calculate the value at other points in time by multiplying or dividing by 1+r, (1.05 in this example).

Two examples:

Value as of time 1 = $\$1 \{ [1 – (1/1.05)^4] / (0.05) \} 1.05^1$ =	$3.7232

Value as of time 6 = $\$1 \{ [1 – (1/1.05)^4] / (0.05) \} 1.05^6$ =	$4.7519

Financial Calculator (time 0): N = 4, I/Y = 5, PV = Answer, PMT = -1, FV = 0
Financial Calculator (time 1): N = 4, I/Y = 5, PV = Answer, PMT = -1, FV = 0. Multiply answer by 1.05^1.
Financial Calculator (time 6): N = 4, I/Y = 5, PV = Answer, PMT = -1, FV = 0. Multiply answer by 1.05^6.

B. Three-year annuity of $1 per year, first cash flow received at t = 0. Interest and discount rate = 5%.

0	1	2	3	4	5
$1	$1	$1	$0	$0	$0

The standard *future value annuity formula* gives a value as of the last year of the annuity (year 2 in this example). This is a three-year annuity. Therefore, 1.05 is raised to the third power in the formula.

Value as of time 2 = $\$1 [(1.05^3 – 1) / 0.05]$ =	$3.1525

The value at other points in time can be calculated by multiplying or dividing by 1.05, raised to the appropriate power.

Value as of time 0 = $\$1 [(1.05^3 – 1) / 0.05] / 1.05^2$ =	$2.8594
Value as of time 4 = $\$1 [(1.05^3 – 1) / 0.05] 1.05^2$ =	$3.4756

The standard *present value annuity formula* gives a value one period before the first payment of the annuity. Therefore, the formula will give you a value at t = -1. You need to multiply by 1 + r to get the value by t = 0.

Value as of time 0 = $\$1 \{ [1 – (1/1.05)^3] / (0.05) \} 1.05^1$ =	$2.8594

The values at time 2 and 4:

Value as of time 2 = $1 { [1 – $(1/1.05)^3$] / (0.05) } 1.05^3 =	$3.1525
Value as of time 4 = $1 { [1 – $(1/1.05)^3$] / (0.05) } 1.05^5 =	$3.4756

C. Five-year annuity of $1 per year, first cash flow received at t = 3. Interest and discount rate = 5%.

0	1	2	3	4	5	6	7	8
$0	$0	$0	$1	$1	$1	$1	$1	$0

The standard *future value annuity formula* gives the value as of the last year of the annuity (t = 7 in this example). This is a five-year annuity. Therefore, 1.05 is raised to the fifth power.

Value as of time 7 = $1 [($1.05^5$ – 1) / 0.05] =	$5.5256

Values at different points in time using the future value annuity formula. A couple of examples

Value as of time 0 = $1 [($1.05^5$ – 1) / 0.05] / 1.05^7 =	$3.9270
Value as of time 4 = $1 [($1.05^5$ – 1) / 0.05] / 1.05^3 =	$4.7732
Value as of time 8 = $1 [($1.05^5$ – 1) / 0.05] 1.05^1 =	$5.8019

The standard *present value annuity formula* gives the value as of the year before the first payment of the annuity (t = 2 in this example).

Value as of time 2 = $1 { [1 – $(1/1.05)^5$] / (0.05) } =	$4.3295

Values at different points in time using the present value annuity formula. A couple of examples:

Value as of time 0 = $1 { [1 – $(1/1.05)^5$] / (0.05) } / 1.05^2 =	$3.9270
Value as of time 4 = $1 { [1 – $(1/1.05)^5$] / (0.05) } 1.05^2 =	$4.7732
Value as of time 8 = $1 { [1 – $(1/1.05)^5$] / (0.05) } 1.05^6 =	$5.8019

6. **Growing Finite Annuities**

A. Four-year growing annuity, growing at 10% per year. First cash flow (equal to $1) received at t = 1. Interest and discount rate = 5%.

0	1	2	3	4	5
$0	$1	$1.1	$1.21	$1.331	$0

Standard formula for the *present value of a finite growing annuity* (for when r is not equal to g) = C_{first} [1 – $[(1 + g) / (1 + r)]^t$] / (r – g). This formula gives the value one period before the first payment (t = 0 in this example).

C_{first} is the first cash flow of the annuity. In this above example, $C_{first} = C_1$ = $1.

Value as of time 0 = $1 { [1 – $(1.10/1.05)^4$] / (0.05 – 0.10) }	$4.0904

Values at different points in time using the present value growing annuity formula. Multiply or divide by 1+r (raised to the appropriate power) to determine the value at other points in time.

Value as of time 2 = $1 { [1 – $(1.10/1.05)^4$] / (0.05 – 0.10) } 1.05^2	$4.5096
Value as of time 4 = $1 { [1 – $(1.10/1.05)^4$] / (0.05 – 0.10) } 1.05^4	$4.9719
Value as of time 5 = $1 { [1 – $(1.10/1.05)^4$] / (0.05 – 0.10) } 1.05^5	$5.2205

B. Four-year growing annuity, growing at 10% per year. First cash flow (equal to $1) received at t = 3. Interest and discount rate = 5%.

0	1	2	3	4	5	6	7
$0	$0	$0	$1	$1.1	$1.21	$1.331	$0

The standard formula for the *present value of a growing annuity* gives you a value at time 2 (one period before the first payment). This is a 4-year annuity. Therefore, 1.05 is raised to the 4^{th} power.

Value as of time 2 = $1 { [1 – $(1.10/1.05)^4$] / (0.05 – 0.10) }	$4.0904

Values at different points in time using the present value growing annuity formula. A few examples:

Value as of time 0 = $1 { [1 – $(1.10/1.05)^4$] / (0.05 – 0.10) } /1.05^2	$3.7101
Value as of time 5 = $1 { [1 – $(1.10/1.05)^4$] / (0.05 – 0.10) } 1.05^3	$4.7351

7. **Perpetual constant annuities**

A. Perpetual constant annuity of $1 (cash flows start at time 1, interest and discount rate = 5%)

0	1	2	3	4	5	→
$0	$1	$1	$1	$1	$1	$1

The standard formula for the *present value of a perpetual constant annuity* is C / r. The formula gives you the value one period before the first payment.

Value as of time 0 = $1 / 0.05	$20.0000

Values at different points in time using the present value perpetual constant annuity formula

Value as of time 1 = ($1 / 0.05) 1.05^1	$21.0000
Value as of time 4 = ($1 / 0.05) 1.05^4	$24.3101

B. Perpetual constant annuity of $1 (cash flows start at time 0, interest and discount rate = 5%)

0	1	2	3	4	5	→
$1	$1	$1	$1	$1	$1	$1

The standard formula for the *present value of a perpetual constant annuity* gives you the value one period before the first payment (t = -1 in this example). Therefore, you need to multiply by 1.05 to get the value at t = 0.

Value as of time 0 = ($1 / 0.05) 1.05	$21.0000

Values at different points in time using the present value perpetual annuity formula. Two examples:

Value as of time 1 = ($1 / 0.05) 1.05^2	$22.0500
Value as of time 4 = ($1 / 0.05) 1.05^5	$25.5256

C. Perpetual constant annuity of $1 (cash flows start at time 5, interest and discount rate = 5%)

0	1	2	3	4	5	→
$0	$0	$0	$0	$0	$1	$1

The standard formula for the *present value of a perpetual constant annuity* gives you the value one period before the first payment (t = 4 in this example).

Value as of time 4 = ($1 / 0.05)	$20.0000

Values at different points in time using the present value perpetual annuity formula. Some examples:

Value as of time 0 = ($1 / 0.05) / 1.05^4	$16.4540
Value as of time 5 = ($1 / 0.05) 1.05^1	$21.0000

D. Perpetual growing annuity, growing at 3% per year (first cash flow, received at time 1, equals $1, interest and discount rate = 5%)

0	1	2	3	→
$0	$1	$1.03	$1.0609	3% more

The standard formula for the *present value of a perpetual growing annuity* is C_{first} / (r – g). The formula gives you the value one period before the first payment.

Value as of time 0 = $1 / (0.05 – 0.03)	$50.0000

Values at different points in time using the present value perpetual growing annuity formula. Some examples:

Value as of time 1 = [$1 / (0.05 – 0.03)] 1.05^1	$52.5000
Value as of time 4 = [$1 / (0.05 – 0.03)] 1.05^4	$60.7753

E. Perpetual growing annuity, growing at 3% per year (first cash flow, received at time 11, equals $1, interest discount rate = 5%)

10	11	12	13	→
$0	$1	$1.03	$1.0609	3% more

The standard formula for the *present value of a perpetual growing annuity* gives you the value one period before the first payment (t = 10 in this example).

Value as of time 10 = [$1 / (0.05 – 0.03)]	$50.0000

Values at different points in time using the present value perpetual growing annuity formula. A few examples:

Value as of time 0 = [$1 / (0.05 – 0.03)] / 1.05^{10}	$30.6957
Value as of time 9 = [$1 / (0.05 – 0.03)] / 1.05^1	$47.6190
Value as of time 11 = [$1 / (0.05 – 0.03)] 1.05^1	$52.5000

F. Two growth-rate example: $1 at time 1, 10% growth rate until time 4, 3% growth rate after time 4 (in perpetuity). Use a 5% discount rate

0	1	2	3	4	5	→
$0	$1	$1.1	$1.21	$1.331	$1.3709	3% more

Value the first four payments using the finite growing annuity formula. Value the payments starting at time 5 using the perpetual growing annuity formula

The first four payments

Value as of time 0 = $1 { [1 – (1.10/1.05)^4] / (0.05 – 0.10) }	$4.0904

The payments starting at time 5

Value as of time 0 = {[($1) (1.1^3) (1.03)] / [(0.05 – 0.03)]} / 1.05^4	$56.3934

Solution = $4.0904 + $56.3934 = $60.4837

Note: [($1) (1.1^3) (1.03)] = $1.3709 = the payment at t = 5

G. Two growth-rate example: $1 at time 0, 10% growth rate until time 12, 3% growth rate after time 12 (in perpetuity). Use a 5% discount rate

0	1	2	. . .	11	12	13	→
$1	$1.1	$1.21	→	$2.8531	$3.1384	$3.2326	3% more

Value the first thirteen payments (t = 0 to t = 12) using the finite growing annuity formula. Value the payments starting at time 13 using the perpetual growing annuity formula

The first thirteen payments

Value as of time 0 = $1 { [1 – (1.10/1.05)^{13}] / (0.05 – 0.10) } 1.05^1	$17.4471

The payments starting at time 13

Value as of time 0 = {[($1) (1.1^{12}) (1.03)] / [(0.05 – 0.03)]} / 1.05^{12}	$90.0011

Solution = $17.4471 + $90.0011 = $107.4482

Note: [($1) (1.1^{12}) (1.03)] = $3.2326 = the payment at t = 13

H. Two growth-rate example: $1 at time 3, 10% growth rate until time 20, 3% growth rate after time 20 (in perpetuity). Use a 5% discount rate

0	1	2	3	4	. . .	20	21	→
$0	$0	$0	$1	$1.1	→	$5.0545	$5.2061	3% more

Value the first eighteen payments (t = 3 to t = 20) using the finite growing annuity formula. Value the payments starting at time 21 using the perpetual growing annuity formula

The first eighteen payments

Value as of time 0 = $1 { [1 – (1.10/1.05)^{18}] / (0.05 – 0.10) } / 1.05^2	$23.7689

The payments starting at time 21

Value as of time 0 = {[($1) (1.1^{17}) (1.03)] / [(0.05 – 0.03)]} / 1.05^{20}	$98.1063

Solution = $23.7689 + $98.1063 = $121.8752

Note: [($1) (1.1^{17}) (1.03)] = $5.2061 = the payment at t = 21

8. **Internal rate of return (IRR)**

Definition: the IRR = the discount rate that causes the sum of the present values of all cash flows to equal zero.

IRR calculation examples

A. Two cash flows

0	1	2	3	4	5
-$1	$0	$0	$0	$0	$2

$-\$1 + \$2 / (1 + r)^5 = \$0$
$r = (\$2 / \$1)^{(1/5)} – 1 = 14.8698\% = IRR$
Financial Calculator: N = 5, I/Y = Answer, PV = -1, PMT = 0, FV = 2

0	1	2	3	4	5
$1	$0	$0	$0	$0	-$2

$\$1 + -\$2 / (1 + r)^5 = \$0$
$r = (\$2 / \$1)^{(1/5)} – 1 = 14.8698\% = IRR$
Financial Calculator: N = 5, I/Y = Answer, PV = 1, PMT = 0, FV = -2

B. Perpetual constant annuities

0	1	2	3	4	→
-$10	$1	$1	$1	$1	$1

$-\$10 + \$1 / r = \$0$
$r = \$1 / \$10 = 10\% = IRR$

C. Perpetual growing annuities

0	1	2	3	4	→
-$10	$1	$1.03	$1.0609	$1.0927	3% more

$-\$10 + \$1 / (r – 3\%) = \$0$
$r = (\$1 / \$10) + 3\% = 13\% = IRR$

D. Other cash flow patterns – <u>solve by your calculator or computer</u>. Example – finite annuity

0	1	2	3	4	5
-$3	$1	$1	$1	$1	$1

$-\$3 + \$1 \{ [1 – (1/(1+r))^5] / r \} = \$0$
$r = 19.8577\% = IRR$
Financial Calculator: N = 5, I/Y = Answer, PV = -3, PMT = 1, FV = 0

9. **Modified Internal Rate of Return (MIRR)**

- *Step one*: Using the discount rate, take a PV (to time zero) of the negative cash flows
- *Step two*: Using the interest rate, take a FV (to time t, where t is the time of the last cash flow) of the positive cash flows
- *Step three*: Calculate the IRR of the two cash flows calculated in the first two steps

A. Using an interest and discount rate = 5%, what is the MIRR of the following cash flow stream?

0	1	2	3	4	5
-$3	$1	$1	$1	$1	$1

Step 1: PV of negative cash flows (at time 0) = -$3
Step 2: FV of positive cash flows (at time 5) = $5.5256
Step 3: IRR = ($5.5256 / $3)$^{(1/5)}$ – 1 = 12.9932% = MIRR

B. Using an interest and discount rate = 5%, what is the MIRR of the following cash flow stream?

0	1	2	3	4	5
+$3	-$1	-$1	-$1	-$1	-$1

Step 1: PV of negative cash flows (at time 0) = -$4.3295
Step 2: FV of positive cash flows (at time 5) = $3.8288
Step 3: IRR = ($3.8288 / $4.3295)$^{(1/5)}$ – 1 = -2.4277% = MIRR

C. Using an interest and discount rate = 5%, what is the MIRR of the following cash flow stream?

0	1	2	3	4	5
+$3	$0	$0	-$1	-$1	$1

Step 1: PV of negative cash flows (at time 0) = -$1.6865
Step 2: FV of positive cash flows (at time 5) = $4.8288
Step 3: IRR = ($4.8288 / $1.6865)$^{(1/5)}$ – 1 = 23.4154% = MIRR

10. **Application – loan amortization schedules**

A 30-year home loan has an annual interest rate of 8%. Interest is compounded monthly. What is the monthly payment on a fully amortizing, level payment loan for $100,000? *$733.7646*

Use this payment to filling in the following loan amortization table for the home loan described above.

Month	Beginning Balance	Total Payment	Interest Payment	Principal Payment	Ending Balance
0					$100,000.000
1	$100,000.000	$733.7646	$666.6667	$67.0979	$99,932.9021
2	$99,932.9021	$733.7646	$666.2193	$67.5452	$99,865.3569
3	$99,865.3569	$733.7646	$665.7690	$67.9955	$99,797.3613
4	$99,797.3613	$733.7646	$665.3157	$68.4488	$99,728.9125
5	$99,728.9125	$733.7646	$664.8594	$68.9052	$99,660.0073

The loan balance will be $0 after the 360th payment.