Brooklyn College

School of Business

Department of Accounting

Accounting 7101X

Accounting for the Non-Accountant
Fall 2012

Handout - Time Value of Money

FUTURE AND PRESENT VALUE OF MONEY

1   On January 1, 2000 Widwoman Company has $10,000 in idle cash available.
Widwoman has located a borrower who needs the funds and will pay 12%
interest, compounded annually. If the borrower will repay the loan
plus accumulated interest on December 31, 2003, what amount will
Widwoman receive on that date?
Compute by:

         A) successive interest computations, and
         B) employing a future value table

2   Assume the same facts as in "1" above except that the borrower feels that
the interest rate is too high and offers to pay Widwoman $14,116 on the due
date of the loan. What interest rate did the borrower use to arrive at this
amount?

3   On January 1, 2000 Widkid Company contracted to buy an office building.
Since the Company was experiencing a shortage of cash, the seller
agreed to take back a $200,000 mortgage on the building.
The mortgage does NOT bear interest and is due ten years from the date of sale.

         A) Widkid Company is aware that there is an interest element involved
            in the mortgage and asks you to determine the cost of the building
            assuming the market rate of interest is 12%.

         B) Prepare the journal entry to record the acquisition of the building.

         C) What journal entries should Widkid make at the end of 2000 and 2001
            to record interest expense on the mortgage?

4 ANNUITIES

BigTalent Theater is a small company that expects to grow rapidly in the near future. The Company wants to set up a fund to finance the construction to refurbish the entire theater in the future. BigTalent will contribute $100,000 to the fund on December 31 of the current year and December 31 of each of the succeeding three years.

A) Using the table below and assuming an 8% compound annual interest rate, compute the fund balance at the end of the four year period.

	Interest Accumulations	Deposit to Fund	Fund balance end of year
YEAR 1			
YEAR 2			
YEAR 3			
YEAR 4			

B) Compute the fund balance at the end of the four year period using a future value table.

C) Assume that the fund balance at the end of the four year period is $477,933. At what compound annual interest rate did the fund earn Interest?

5 ANNUITY DUE

Assume the same facts as in "4" above, except that BigTalent will contribute $100,000 on January 1, of the current year and each of the succeeding three years. What will be the fund balance at the end of year four.

1) Mr. Adams has $500 to invest. He wishes to know how much it will amount to if he invests it at 8 percent per year for 33 years.

2) Ms. Black wishes to have $15,000 at the end of 8 years. How much must she invest today to accomplish this purpose if the interest rate is 8 percent?

3) Mr. Case plans to set aside $4,000 each year, the first payment to be made on January 1, 2002, and the last on January 1, 2007. How much will he have accumulated by January1, 2007 if the interest rate is 8 percent?

4) Ms. David wants to have $450,000 on her sixty-fifth birthday. She asks you to tell her how much she must deposit on each birthday from her fifty-eighth to sixty-fifth, inclusive, in order to receive this amount. Assume the interest of 12 percent.

5) If Mr. Edward invests $900 on June 1 of each year from 2002 to 2012, inclusive how much will he have accumulated on June 1, 2013 (note that 1 year elapses after last payment) if the interest rate is 10 percent.

6) Mr. Frank has $145,000 with which he purchases an annuity on February 1, 2002. The annuity consists of six annual payments, the first to be made on February 1, 2003. How much will he receive in each payment? Assume an interest rate of 12%.

3

Handout
TIME VALUE OF MONEY - LOAN AMORTIZATION

You obtain a $14,000 loan to finance the purchase of a car on January 1, 2010.

The terms of the loan require monthly payments of $465 (fully amortizing loan)
the first payment to be made on February 1, 2010, and the last on January 1, 2013
(three years), at a 12% interest rate.

Complete column (a) on attached schedule for this loan.

Alternatively, you could borrow the same $14,000, at the same interest rate (12%),
for the same number of periods (thirty-six), by making the following payments:

(b)	270
(c)	140
(d)	70
(e)	0

HINT
First calculate the present value of each of the payment streams above.
Then calculate the remaining balance of the loan (balloon payment).

4

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Handout - Car Loan Worksheet

	CASE (a)	CASE (b)	CASE (c)	CASE (d)	CASE (e)
Interest rate					
Lenth of period					
Number of periods					
First period payment					
First period expense					
Periodic payments					
Balloon payment					
Total payments					
Present value (amount borrowed)					
Total expense					

5

PARTIAL AMORTIZATION	270
ZERO AMORTIZATION	140
NEGATIVE AMORTIZATION	70
BALLOON PAYMENT ONLY	*0*

	Interest	Payment	Amortization of Principle	Unamortized Principle
ORIGINAL LOAN				14,000
1	14,000	140	465	325	13,675
2	13,675	137	465	328	13,347
3	13,347	133	465	332	13,015
4	13,015	130	465	335	12,680
5	12,680	127	465	338	12,342
6	12,342	123	465	342	12,001
7	12,001	120	465	345	11,656
8	11,656	117	465	348	11,307
9	11,307	113	465	352	10,955
10	10,955	110	465	355	10,600
11	10,600	106	465	359	10,241
12	10,241	102	465	363	9,878
13	9,878	99	465	366	9,512
14	9,512	95	465	370	9,142
15	9,142	91	465	374	8,769
16	8,769	88	465	377	8,391
17	8,391	84	465	381	8,010
18	8,010	80	465	385	7,625
19	7,625	76	465	389	7,236
20	7,236	72	465	393	6,844
21	6,844	68	465	397	6,447
22	6,447	64	465	401	6,047
23	6,047	60	465	405	5,642
24	5,642	56	465	409	5,234
25	5,234	52	465	413	4,821
26	4,821	48	465	417	4,404
27	4,404	44	465	421	3,983
28	3,983	40	465	425	3,558
29	3,558	36	465	429	3,129
30	3,129	31	465	434	2,695
31	2,695	27	465	438	2,257
32	2,257	23	465	442	1,814
33	1,814	18	465	447	1,368
34	1,368	14	465	451	916
35	916	9	465	456	460
36	460	5	465	460	0

6

FULLY AMORTIZED	465
PARTIAL AMORTIZATION	270
ZERO AMORTIZATION	140
NEGATIVE AMORTIZATION	70
BALLOON PAYMENT ONLY	0

		Interest	Payment	Amortization of Principle	Unamortized Principle
ORIGINAL LOAN					14,000
1	14,000	140	270	130	13,870
2	13,870	139	270	131	13,739
3	13,739	137	270	133	13,606
4	13,606	136	270	134	13,472
5	13,472	135	270	135	13,337
6	13,337	133	270	137	13,200
7	13,200	132	270	138	13,062
8	13,062	131	270	139	12,923
9	12,923	129	270	141	12,782
10	12,782	128	270	142	12,640
11	12,640	126	270	144	12,496
12	12,496	125	270	145	12,351
13	12,351	124	270	146	12,205
14	12,205	122	270	148	12,057
15	12,057	121	270	149	11,907
16	11,907	119	270	151	11,756
17	11,756	118	270	152	11,604
18	11,604	116	270	154	11,450
19	11,450	115	270	155	11,295
20	11,295	113	270	157	11,138
21	11,138	111	270	159	10,979
22	10,979	110	270	160	10,819
23	10,819	108	270	162	10,657
24	10,657	107	270	163	10,493
25	10,493	105	270	165	10,328
26	10,328	103	270	167	10,162
27	10,162	102	270	168	9,993
28	9,993	100	270	170	9,823
29	9,823	98	270	172	9,651
30	9,651	97	270	173	9,478
31	9,478	95	270	175	9,303
32	9,303	93	270	177	9,126
33	9,126	91	270	179	8,947
34	8,947	89	270	181	8,766
35	8,766	88	270	182	8,584
36	8,584	86	270	184	8,400

7

FULLY AMORTIZED	465
PARTIAL AMORTIZATION	270
ZERO AMORTIZATION	140
NEGATIVE AMORTIZATION	70
BALLOON PAYMENT ONLY	0

		Interest	Payment	Amortization of Principle	Unamortized Principle
ORIGINAL LOAN					14,000
1	14,000	140	140	0	14,000
2	14,000	140	140	0	14,000
3	14,000	140	140	0	14,000
4	14,000	140	140	0	14,000
5	14,000	140	140	0	14,000
6	14,000	140	140	0	14,000
7	14,000	140	140	0	14,000
8	14,000	140	140	0	14,000
9	14,000	140	140	0	14,000
10	14,000	140	140	0	14,000
11	14,000	140	140	0	14,000
12	14,000	140	140	0	14,000
13	14,000	140	140	0	14,000
14	14,000	140	140	0	14,000
15	14,000	140	140	0	14,000
16	14,000	140	140	0	14,000
17	14,000	140	140	0	14,000
18	14,000	140	140	0	14,000
19	14,000	140	140	0	14,000
20	14,000	140	140	0	14,000
21	14,000	140	140	0	14,000
22	14,000	140	140	0	14,000
23	14,000	140	140	0	14,000
24	14,000	140	140	0	14,000
25	14,000	140	140	0	14,000
26	14,000	140	140	0	14,000
27	14,000	140	140	0	14,000
28	14,000	140	140	0	14,000
29	14,000	140	140	0	14,000
30	14,000	140	140	0	14,000
31	14,000	140	140	0	14,000
32	14,000	140	140	0	14,000
33	14,000	140	140	0	14,000
34	14,000	140	140	0	14,000
35	14,000	140	140	0	14,000
36	14,000	140	140	0	14,000

8

FULLY AMORTIZED	465
PARTIAL AMORTIZATION	270
ZERO AMORTIZATION	140
NEGATIVE AMORTIZATION	70
BALLOON PAYMENT ONLY	0

	Interest	Payment	Amortization of Principle	Unamortized Principle
ORIGINAL LOAN				14,000
1	14,000	140	70	-70	14,070
2	14,070	141	70	-71	14,141
3	14,141	141	70	-71	14,212
4	14,212	142	70	-72	14,284
5	14,284	143	70	-73	14,357
6	14,357	144	70	-74	14,431
7	14,431	144	70	-74	14,505
8	14,505	145	70	-75	14,580
9	14,580	146	70	-76	14,656
10	14,656	147	70	-77	14,732
11	14,732	147	70	-77	14,810
12	14,810	148	70	-78	14,888
13	14,888	149	70	-79	14,967
14	14,967	150	70	-80	15,046
15	15,046	150	70	-80	15,127
16	15,127	151	70	-81	15,208
17	15,208	152	70	-82	15,290
18	15,290	153	70	-83	15,373
19	15,373	154	70	-84	15,457
20	15,457	155	70	-85	15,541
21	15,541	155	70	-85	15,627
22	15,627	156	70	-86	15,713
23	15,713	157	70	-87	15,800
24	15,800	158	70	-88	15,888
25	15,888	159	70	-89	15,977
26	15,977	160	70	-90	16,067
27	16,067	161	70	-91	16,157
28	16,157	162	70	-92	16,249
29	16,249	162	70	-92	16,342
30	16,342	163	70	-93	16,435
31	16,435	164	70	-94	16,529
32	16,529	165	70	-95	16,625
33	16,625	166	70	-96	16,721
34	16,721	167	70	-97	16,818
35	16,818	168	70	-98	16,916
36	16,916	169	70	-99	17,015

9

FULLY AMORTIZED	465
PARTIAL AMORTIZATION	270
ZERO AMORTIZATION	140
NEGATIVE AMORTIZATION	70
BALLOON PAYMENT ONLY	0

		Interest	Payment	Amortization of Principle	Unamortized Principle
ORIGINAL LOAN					14,000
1	14,000	140	0	-140	14,140
2	14,140	141	0	-141	14,281
3	14,281	143	0	-143	14,424
4	14,424	144	0	-144	14,568
5	14,568	146	0	-146	14,714
6	14,714	147	0	-147	14,861
7	14,861	149	0	-149	15,010
8	15,010	150	0	-150	15,160
9	15,160	152	0	-152	15,312
10	15,312	153	0	-153	15,465
11	15,465	155	0	-155	15,619
12	15,619	156	0	-156	15,776
13	15,776	158	0	-158	15,933
14	15,933	159	0	-159	16,093
15	16,093	161	0	-161	16,254
16	16,254	163	0	-163	16,416
17	16,416	164	0	-164	16,580
18	16,580	166	0	-166	16,746
19	16,746	167	0	-167	16,914
20	16,914	169	0	-169	17,083
21	17,083	171	0	-171	17,253
22	17,253	173	0	-173	17,426
23	17,426	174	0	-174	17,600
24	17,600	176	0	-176	17,776
25	17,776	178	0	-178	17,954
26	17,954	180	0	-180	18,134
27	18,134	181	0	-181	18,315
28	18,315	183	0	-183	18,498
29	18,498	185	0	-185	18,683
30	18,683	187	0	-187	18,870
31	18,870	189	0	-189	19,059
32	19,059	191	0	-191	19,249
33	19,249	192	0	-192	19,442
34	19,442	194	0	-194	19,636
35	19,636	196	0	-196	19,832
36	19,832	198	0	-198	20,031

10

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Handout - Car Loan Worksheet

	CASE (a)	CASE (b)	CASE (c)	CASE (d)	CASE (e)
Interest rate	1%	1%	1%	1%	1%
Lenth of period	1 month	1 month	1 month	1 month	1 month
Number of periods	36	36	36	36	36
First period payment	465	270	140	70	0
First period expense	140	140	140	140	140
Periodic payments	16,740	9,720	5,040	2,520	-
Balloon payment	-	8,400	14,000	17,015	20,031
Total payments	16,740	18,120	19,040	19,535	20,031
Present value (amount borrowed)	14,000	14,000	14,000	14,000	14,000
Total expense	2,740	4,120	5,040	5,535	6,031

11