Assume that you purchase a 4-year savings certificate for 1000 with an 10% annual interest.

1. Assume semi-annual compouding, what is the value of the certifacate when it matures?
2. Assume annual compouding, what is the value of the certifacate when it matures?

0	1	2	3	4			0	1
1000.0	1100.0	1210.0	1331.0	1464.1	SpreadSheet Approach		1000.0	1050.0
					1464.1	Formula Approach		

PV	1000
IR	0.1
n	4

2	3	4	5	6	7	8	
1102.5	1157.6	1215.5	1276.3	1340.1	1407.1	1477.5	SpreadSheet Approach
						1477.5	Formula Approach

You are asked to lend 200 in return for 300.

1. If you receive 300 in 4 years, what annual interest rate has been offered to you?

0	1	2	3	4
200.0	221.3	244.9	271.1	300.0

PV	200	
FV	300	
n	4	
IR	**10.67%**	**SpreadSheet Approach**
IR	**10.67%**	**Formula Approach**

In January 2013, the core inflation rate in Venezuela was about 23%. How long it takes (in months) for purchasing power to be cut in half? In September 2018 the inflation rate in Venezuela was about 480000%. How long it takes (in days) for purchasing power to be cut in half?

PV	0.5
FV	1
inflation	0.23
years	3.35
months	40.20

PV	0.5
FV	1
inflation	4800
years	0.08
days	29.2

You are offered 2000 for an investment that gives you 500 at the end of the next 4 years. Returns on simila similarly risky assets would increase to 7% is it true that the value of this investment also increases?

	0	1	2	3	4
4		500	500	500	500
interest rate	0.07		467.3	436.7	408.1	381.4
PV	1693.61 Spreadsheet approach
PV	1693.61 Formula approach

arly risky assets are currently at the 4%. If the returns on

You have applied for a mortgage of 240000 to finance the purchase of a new home. The bank will require y
loan, how much principal will be repaid in the first and the last year?

			Loan balance	Interest	Principal			
							PMT	9600
0							PV	240000
1	9600	9484.38	240000	2926	6674	Spreadsheet approach	FV	288000
2	9600	9370.15	233326	2844	6756		Interest	1.219%
3	9600	9257.29	226570	2762	6838		years	30
4	9600	9145.80	219732	2679	6921			0.01
5	9600	9035.65	212811	2594	7006			
6	9600	8926.82	205805	2509	7091			
7	9600	8819.31	198714	2422	7178			
8	9600	8713.09	191537	2335	7265			
9	9600	8608.15	184272	2246	7354			
10	9600	8504.47	176918	2157	7443			
11	9600	8402.04	169475	2066	7534			
12	9600	8300.85	161941	1974	7626			
13	9600	8200.87	154315	1881	7719			
14	9600	8102.10	146596	1787	7813			
15	9600	8004.52	138784	1692	7908			
16	9600	7908.11	130875	1595	8005			
17	9600	7812.87	122871	1498	8102			
18	9600	7718.77	114769	1399	8201			
19	9600	7625.81	106568	1299	8301			
20	9600	7533.96	98267	1198	8402			
21	9600	7443.22	89865	1096	8504			
22	9600	7353.58	81361	992	8608			
23	9600	7265.01	72752	887	8713			
24	9600	7177.51	64039	781	8819			
25	9600	7091.06	55220	673	8927			
26	9600	7005.66	46293	564	9036			
27	9600	6921.28	37258	454	9146			
28	9600	6837.92	28112	343	9257			
29	9600	6755.57	18855	230	9370			
30	9600	6674.20	9484	116	9484			

you to make annual payments of 9600 at the end of each 30 years. Determine the interest rate in effect on this mortgage. If tl

0.6%

his is an amortized

You are a manager and want to allow your customers to buy on credit with 3 months until they pay your accou
resort to a bank credit given to you at the 6% annually with monthly compounding. What (minimum) interest r
from the short-term bank credit?

Bank		Customer	
Nominal annual	0.06	Nominal annual	6.03%
Monthly compounding	12	Compounding	3
EAR (EFF)	6.17%	EAR (EFF)	6.17%

ints payable. Meanwhile you need to finance those accounts payable and you
rate (in annual terms) should you give your costumer so, that you cover you costs

Assume that you purchase a 6-year savings certi cate for 1000 with an 8% interest compounded annually. C

0	1	2	3	4	5	6	
1000.0	1080.0	1166.4	1259.7	1360.5	1469.3	1586.9	SpreadSheet Approach
0.08						1586.9	Formula Approach

Calculate the value of the certificate when it matures (future value).

Assume that you purchase a 6-year savings certi cate for 1000 with an 8% annual interest compounded semiannually. Calculate the value of the certi cate when it matures (future value).

0	0.5	1	1.5	2	2.5	3	3.5	4	4.5	5	5.5	6
0	1	2	3	4	5	6	7	8	9	10	11	12
1000.0	1040.0	1081.6	1124.9	1169.9	1216.7	1265.3	1315.9	1368.6	1423.3	1480.2	1539.5	1601.0

0.08

1601.0

SpreadSheet Approach
Formula Approach

You are asked to lend 500 in return for 600 after two years. What annual interest rate has been offered to you?

Formula approach

	0	1	2
PV	500	547.7226	600
i	9.54%		
FV	600		

Spreadsheet approach

	0	1	2
PV	500	547.7227	600.0004
i	9.54%		
FV	600		

In the past 10 years the inflation rate in Turkey was about 8%. How long it takes (to the nearest year) for the purchasing power to be cut in half? How would the result change with a much lower 4% inflation rate?

		Check									
			1	2	3	4	5	6	7	8	9
PV	0.5	year	1	2	3	4	5	6	7	8	9
FV	1	FV	0.54	0.58	0.63	0.68	0.73	0.79	0.86	0.93	1.00
inflation	0.08	PV	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5
years	9.01										
inflation	0.04										
years	17.67										

How much would you be willing to pay today for an investment that would return 800 at the end of each y

		0	1	2	3	4	5	6
	6		800	800	800	800	800	800
interest rate	0.05		761.9	725.6	691.1	658.2	626.8	597.0
PV		4060.55 Spreadsheet approach						
PV		4060.55 Formula approach						

$$PVA_N = PMT\left[\frac{1}{I} - \frac{1}{I(1+I)^N}\right]$$ (4-7)

ear for the next 6 years? Assume a discount rate of 5%.

You have applied for a mortgage of 140000 to finance the purchase of a new home. The bank will requi
loan, how much principal will be repaid in the second year?

			Loan balance	Interest	Principal			PV	140000
0								FV	198000
1	6600	6445.31	140000	3360	3240	Spreadsheet approach	Interest		2.4%
2	6600	6294.25	136760	3282	3318		years		30
3	6600	6146.73	133442	3203	3397				
4	6600	6002.67	130045	3121	3479				
5	6600	5861.98	126566	3038	3562				
6	6600	5724.59	123004	2952	3648	Now, to understand what is going on, imagine t			
7	6600	5590.42	119356	2865	3735	mortage in one instalment at the end of the peri			
8	6600	5459.39	115620	2775	3825	198000. What is the annual interest rate? It is			
9	6600	5331.44	111795	2683	3917	(198000/140000)^(1/30) = 1.16% not much. I			
10	6600	5206.48	107878	2589	4011	mortgage like that. However, we are paying at			
11	6600	5084.46	103867	2493	4107	So compared to the previous situation you loos			
12	6600	4965.29	99760	2394	4206	invest 6600 because you pay that money to the			
13	6600	4848.91	95554	2293	4307	the bank has the ability to re-invest those 6600			
14	6600	4735.27	91248	2190	4410	Remember, financial management is a lot abou			
15	6600	4624.29	86837	2084	4516	opportunity costs. Now, we have to find this re			
16	6600	4515.90	82322	1976	4624	we are going to find it using a discounting appr			
17	6600	4410.06	77697	1865	4735				
18	6600	4306.70	72962	1751	4849				
19	6600	4205.76	68113	1635	4965				
20	6600	4107.19	63148	1516	5084				
21	6600	4010.93	58063	1394	5206				
22	6600	3916.92	52857	1269	5331				
23	6600	3825.12	47525	1141	5459				
24	6600	3735.47	42066	1010	5590				
25	6600	3647.92	36476	875	5725				
26	6600	3562.42	30751	738	5862				
27	6600	3478.93	24889	597	6003				
28	6600	3397.39	18886	453	6147				
29	6600	3317.76	12740	306	6294				
30	6600	3240.00	6445	155	6445				
		139999.95	0						

re you to make annual payments of 6600 at the end of each 30 years. Determine the interest rate in effect on this mortgage. I

			Loan balance	Interest	Principal			
	0						PV	60000
1.16%							FV	140951
	1	7047.55	6406.87	60000.0	6000.0	1047.6	Spreadsheet approach Interest	10.0%
	2	7047.55	5824.43	58952.4	5895.2	1152.3	years	20
	3	7047.55	5294.93	57800.1	5780.0	1267.6		
	4	7047.55	4813.58	56532.5	5653.2	1394.3		
	5	7047.55	4375.98	55138.2	5513.8	1533.8		
	6	7047.55	3978.17	53604.5	5360.4	1687.1		
	7	7047.55	3616.52	51917.3	5191.7	1855.8		
	8	7047.55	3287.74	50061.5	5006.1	2041.4		
	9	7047.55	2988.86	48020.1	4802.0	2245.6		
	10	7047.55	2717.15	45774.5	4577.4	2470.1		
	11	7047.55	2470.13	43304.4	4330.4	2717.1		
	12	7047.55	2245.58	40587.3	4058.7	2988.8		
	13	7047.55	2041.43	37598.4	3759.8	3287.7		
	14	7047.55	1855.85	34310.7	3431.1	3616.5		
	15	7047.55	1687.14	30694.2	3069.4	3978.1		
	16	7047.55	1533.76	26716.1	2671.6	4376.0		
	17	7047.55	1394.33	22340.1	2234.0	4813.5		
	18	7047.55	1267.57	17526.6	1752.6	5294.9		
	19	7047.55	1152.34	12231.6	1223.2	5824.4		
	20	7047.55	1047.58	6407.3	640.7	6406.8		
			59999.94					

Left margin fragments:

that you pay-off the
iod, i.e. 6600 x 30 =

would like to have a
the end of each year.
e the opportunity to
bank! Or equivalently,
they receive from you.
t alternatives and
-investment rate and
·oach.

If this is an amortized

A company is offereing bonds which pay 100 per year indefinitely. If you require a 12% return on these b

		Spreadshe	833.3323
Formula approach		1	89.28571
PMT	100	2	79.71939
Interest rate	0.12	3	71.17802
PV	833.33	4	63.55181
		5	56.74269
		6	50.66311
		7	45.23492
		8	40.38832
		9	36.061
		10	32.19732
		11	28.74761
		12	25.66751
		13	22.91742
		14	20.46198
		15	18.26963
		16	16.31217
		17	14.56443
		18	13.00396
		19	11.61068
		20	10.36668
		21	9.255961
		22	8.264251
		23	7.378796
		24	6.58821
		25	5.882331
		26	5.252081
		27	4.689358
		28	4.186927
		29	3.738327
		30	3.337792
		31	2.980172
		32	2.660868
		33	2.375775
		34	2.121227
		35	1.893953
		36	1.691029
		37	1.509848
		38	1.348078
		39	1.203641
		40	1.07468
		41	0.959536
		42	0.856728
		43	0.764936
		44	0.682978
		45	0.609802
		46	0.544466
		47	0.486131
		48	0.434045
		49	0.38754
		50	0.346018
		51	0.308945
		52	0.275844

53	0.246289
54	0.219901
55	0.19634
56	0.175304
57	0.156521
58	0.139751
59	0.124778
60	0.111409
61	0.099472
62	0.088814
63	0.079298
64	0.070802
65	0.063216
66	0.056443
67	0.050396
68	0.044996
69	0.040175
70	0.035871
71	0.032027
72	0.028596
73	0.025532
74	0.022796
75	0.020354
76	0.018173
77	0.016226
78	0.014488
79	0.012935
80	0.011549
81	0.010312
82	0.009207
83	0.008221
84	0.00734
85	0.006553
86	0.005851
87	0.005224
88	0.004665
89	0.004165
90	0.003719
91	0.00332
92	0.002964
93	0.002647
94	0.002363
95	0.00211
96	0.001884
97	0.001682
98	0.001502
99	0.001341
100	0.001197
101	0.001069
102	0.000954
103	0.000852
104	0.000761
105	0.000679
106	0.000607
107	0.000542
108	0.000484
109	0.000432

110	0.000385
111	0.000344
112	0.000307
113	0.000274
114	0.000245
115	0.000219
116	0.000195
117	0.000174
118	0.000156
119	0.000139
120	0.000124

onds (the discount rate) what is the value of each bond today?