KENT FAMILY FINANCES

FACTS

Ken and Kendra Kent have been married twelve years and have twin 4-year-old sons. Kendra earns $78,000 as a Walmart assistant manager and Ken is a stay-at-home dad. They give you the following information about their finances.

EXERCISES

1. Using the information in item (1) on h/o 2, determine which accounts are assets and liabilities and prepare a balance sheet in proper form as of April 30, 2007. The solution is on h/o 3.

2. Prepare an income statement for May, considering the following:

   (a) The payroll deductions are all expenses except the 401(k) contribution. The contribution reduces her net pay and has the effect of reducing cash and increasing her 401(k) account balance by $100. One asset is increased and another asset is reduced by the same amount. As discussed on casebook page 5 below the income statement, these are balancing entries on the balance sheet; neither is an income nor an expense.

   (b) All May expenditures are expenses except the principal payments on the loans and the $1,000 investment in the mutual fund. The loan payments reduce an asset (cash) and liabilities (the loan balances). The mutual fund investment reduces one asset (cash) and increases another asset (mutual fund investment). These are also balancing entries on the balance sheet and are not expenses.

   The solution is on h/o 3.

3. Prepare a Balance Sheet as of May 31, 2007. All of the ending balances are in the facts except net worth. The following items affected net worth during the month:

   (a) net income for the month as shown on the income statement;

   (b) the increase in value of the mutual fund investment (not counting their additional investment).

   The solution is on h/o 4.

Additional Information

Kendra read the income statement and balance sheets and could not determine what accounted for their increase in net worth. Accountants typically include a reconciliation of net worth in the financial statements so the reader of the statements can readily see the factors that increased (or decreased) net worth during the year. A Reconciliation appears below the Balance Sheet on h/o 4.

Kendra also asked why their cash balance increased less than their monthly income. She wants to know how the family spent their cash. The Cash Flow Statement on h/o 5 provides this information to her. We will discuss it in class.

(1) Assets and Liabilities (FMV) (in alphabetical order)

	4/30/07	5/31/07
401(k) retirement account	$12,500	$12,600
car loan, current portion	317	317
car loan, remaining balance	12,018	11,771
checking account	4,000	4,164
condominium	235,000	235,000
credit card balance	3,178	2,600
IRA account	42,000	42,000
mortgage loan, current portion	1,449	1,449
mortgage loan, remaining balance	172,666	172,480
mutual fund	22,000	23,700
net worth	150,872	??
savings account	10,000	10,000
Toyota	15,000	15,000

(2) May Income

Kendra's salary is $6,500 per month; the following amounts were deducted from her May paycheck:

FICA (6.2% of her salary)	$ 403
medicare tax (1.45% of her salary)	94
Federal income tax withheld	500
Illinois income tax withheld	195
health insurance premium	105
401(k) contribution	100
total withheld	1,397

(3) May Expenditures

car maintenance and gas		$172
clothing		111
entertainment		147
groceries		422
miscellaneous		252
utilities and telephone		375
mortgage payment:		
principal payment	$186	
interest	863	
real estate tax	517	
	1,566	1,566
car payment:		
principal payment	246	
interest	70	
	316	316
mutual fund investment		1,000
total expenditures		3,981

FINANCIAL STATEMENTS

KENT FAMILY BALANCE SHEET
as of April 30, 2007

Assets		**Liabilities and Net Worth**	
Current Assets		Current Liabilities	
Checking Account	$ 4,000	Credit Card	$3,178
Savings Account	10,000	Car Loan, current portion	317
Mutual Fund	22,000	Mortgage Loan, current portion	1,449
Total Current Assets	36,000	Total Current Liabilities	4,944
Other Assets		Other Liabilities	
IRA	42,000	Car Loan balance	12,018
401(k)	12,500	Mortgage Loan balance	172,666
2003 Toyota	15,000		
Condominium	235,000	Total Liabilities	189,628
		Net Worth	150,872
Total Assets	$340,500	**Total Liabilities and Net Worth**	$340,500

KENT FAMILY INCOME STATEMENT
For the month of May, 2007

Revenues		
Salary		$6,500
Expenses		
Car Maintenance and Gas	$172	
Clothing	111	
Entertainment	147	
Federal Withholding Tax	500	
FICA tax	403	
Groceries	422	
Health Insurance	105	
Illinois Income Tax	195	
Interest on Car Loan	70	
Interest on Mortgage Loan	863	
Medicare Tax	94	
Miscellaneous	252	
Real Estate Tax	517	
Utilities and Telephone	375	
Total Expenses	4,226	(4,226)
Surplus (Net Income)		$2,274

KENT FAMILY BALANCE SHEET
as of May 31, 2007

Assets		**Liabilities and Net Worth**	
Current Assets		Current Liabilities	
Checking Account	$ 4,164	Credit Card	$ 2,600
Savings Account	10,000	Car Loan, current portion	317
Mutual Fund	23,700	Mortgage Loan, current portion	1,449
Total Current Assets	37,864	Total Current Liabilities	4,366
Other Assets		Other Liabilities	
IRA	42,000	Car Loan balance	11,771
401(k)	12,600	Mortgage Loan balance	172,480
2003 Toyota	15,000		
Condominium	235,000	Total Liabilities	188,617
		Net Worth	153,847
Total Assets	$342,464	**Total Liabilities and Net Worth**	$342,464

KENT FAMILY RECONCILIATION OF NET WORTH
for the month of May, 2007

Additions to Net Worth	
May surplus	$ 2,274
Mutual fund appreciation	700
Total Additions	2,974
Reductions in Net Worth	0
Increase in net worth	**2,974**
Add Net Worth on April 30, 2007	150,872
Equals Net Worth on May 31, 2007	$153,846

KENT FAMILY CASH FLOW STATEMENT
for the month of May, 2007

Sources of Cash		
May Surplus		$ 2,274
Uses of Cash		
For Debt Payments		
Car Loan Principal Payment	$ 246	
Mortgage Loan Principal Payment	186	
Reduction of Credit Card Balance	578	
Cash Used for Debt Payments	1,010	(1,010)
For Investments		
Investment in Mutual Fund	1,000	
401(k) contribution	100	
Cash Used for Investments	1,100	(1,100)
Increase in Cash		$164
Add Cash on April 30, 2007		4,000
Equals Cash on May 31, 2007		$4,164

TIME VALUE OF MONEY

Another crucial principle used to analyze competing investment opportunities is the time value of money, which consists of four different computations:

1. the present value of a dollar (how much is an amount to be received in the future worth today);
2. the future value of a dollar (how much will a present amount be worth at a time in the future);
3. the present value of an annuity (how much is a series of payments to be received worth today);
4. future value of an annuity (how much will a series of payments be worth in the future).

An algebraic formula, tables or a calculator can be used to calculate the time value of money. We will use the calculator available at http://www.uic.edu/classes/actg/actg500/pfvatutor.htm to make the computations. Click on the link and keep it open on your desktop as you read this handout. Enter dollar amounts in the calculator without commas.

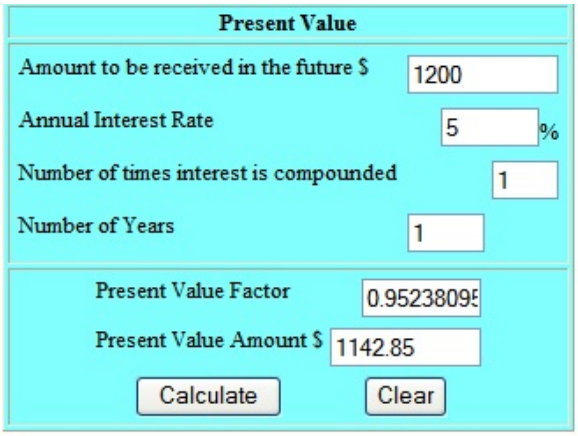
1. Present Value of a Dollar ("PV")

The technique used to translate the value of future dollars back to the present is called discounting, and the value of those discounted dollars is called the present value. An investor would prefer to receive $100 today rather than $100 a year from now. If the investor receives $100 today she can invest it and will have more than $100 in a year. The value of a dollar today is $1; the value today of a right to receive a dollar one year from now is less than $1.

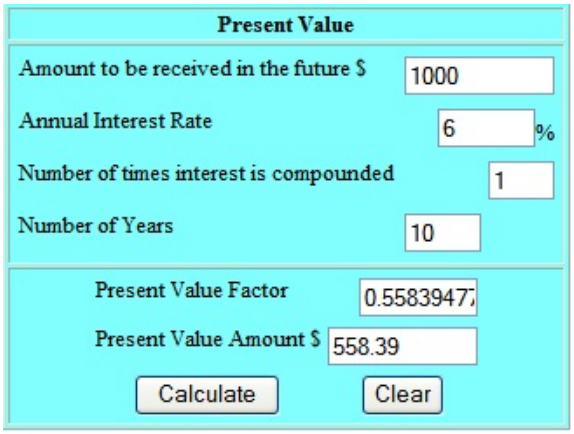
Charles has a right to receive $1,200 one year from now; how much is it worth today if the current interest rate is 5%? What is the present value of $1,200 to be received in one year discounted at 5%? Enter the following amounts in the Present Value calculator: 1200 (without a comma) in the Amount to be received in the future ("amount") field; 5 in the Annual Interest Rate ("rate") field; 1 in the Number of times interest is compounded ("compound") field; and 1 in the Number of Years ("years") field. Click "calculate." The present value of $1,200 discounted for one year at 5% is $1,143 (always round the computations).

The $57 difference between the $1,200 future value and the $1,143 present value is interest. In other words, if an investor deposited $1,143 for one year in a savings account paying 5% interest, it would be worth $1,200 at the end of the year.

amount field ➜
interest field ➜
compound field ➜
years field ➜



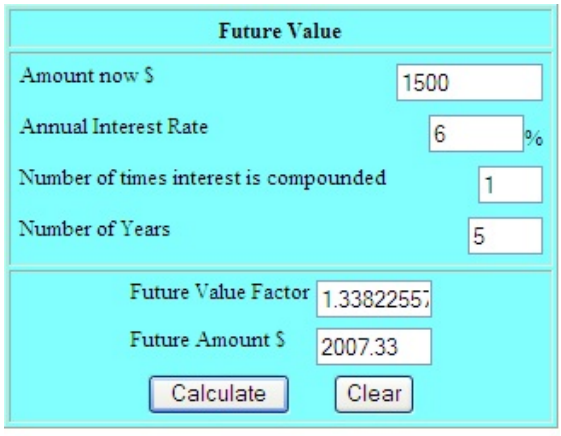
Zero coupon bonds, which we will study later, do not pay interest each year; instead they pay a specified amount at some time in the future. Assume a zero coupon bond will pay $1,000 ten years from now and the current interest rate is 6%. How much should an investor pay for that bond? What is the present value of $1,000 discounted at 6% for ten years? Enter $1,000 in the amount field of the present value calculator, 6 in the rate field, 1 in the compound field and 10 in the years field. The present value is $559. To put it another way, if the investor deposited $559 in a 10-year certificate of deposit with a 6% interest rate, she will have $1,000 at the end of ten years.



2. Future Value of a Dollar ("FV")

The concept of present value brings cash from the future back to the present. Future value brings current values into the future. This calculation determines how money invested today will be worth in the future.

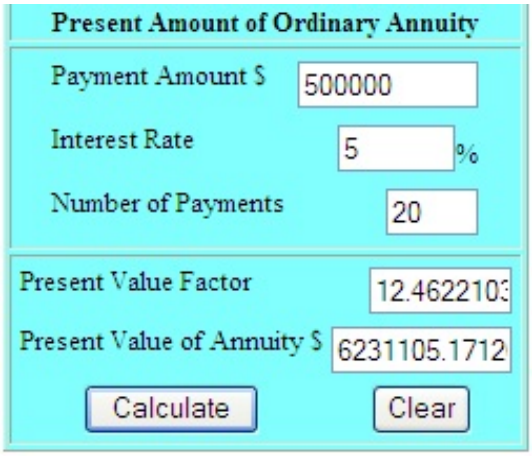
Andrew deposits $1,500 in a savings account that pays 6% annually and wants to know what the account will be worth in five years. Use the future value calculator and enter 1500 in the Amount Now ("amount") field, 6 in rate field; 1 in the compound field and 5 in the years field. Click calculate; the future value is $2,007. He will have earned $507 of interest in the five years ($2,007 ending balance minus the $1,500 beginning balance).



3. **Present Value of an Annuity (PVA)**

An annuity is a series of equal payments to be received each year for a specified period. The present value of an annuity calculates the present value of all of the payments to be received in the future.

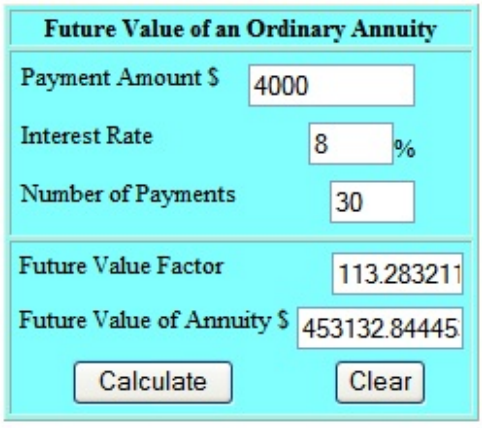
Spak won a $10 million lottery, payable in 20 annual installments of $500,000. (This state lottery did not give the winner an option to receive a lump sum.) He is considering selling the right to his future payments and wants to know their present value if the current interest rate is 5%. What is the present value of the right to receive$500,000 per year for 20 years, discounted at 5%? Enter 500000 in the Payment Amount "(payment") field of the Present Amount of an Ordinary Annuity calculator, 5 in the rate field and 20 in the payments field. Click calculate. The present value is $6,231,105.



4. Future Value of an Annuity

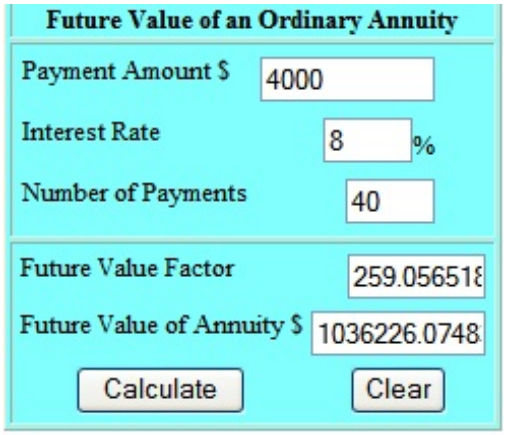
The future value of an annuity calculates how much an investor will have at the end of a specified time if is she contributes an equal amount each year. The calculation is similar to the future value of a dollar, except instead of one payment, there is a series of payments.

Halpern deposits $4,000 to his 401(k) account every year for thirty years; we will assume it will earn at the rate of 8%. How much will the account be worth in 30 years? Enter 4000 in amount field of the Future Value of an Ordinary Annuity calculator, 8 in the rate field and 30 in the years field. The future value is $453,133.



Halpern deposited only $120,000 of his own funds ($4,000 x 30 years); the $333,133 balance of the account is income he earned.

If Halpern contributed $4,000 a year for 40 years instead of 30, the account balance will grow to $1,036,226. He invested $160,000 and he will have earned $876,226.

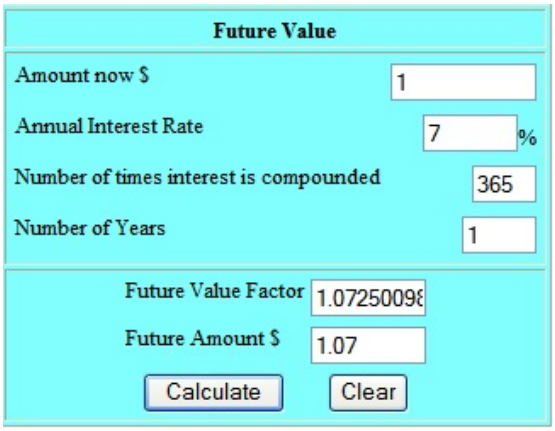


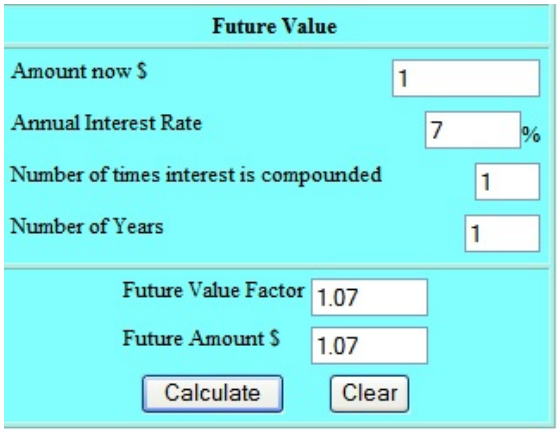
Simple Interest vs. Compounded Interest

Another key concept is compounding, or compound interest. That is, the ability to earn interest on the interest accumulated in prior periods. This is a very important concept that has many applications in personal investing. Simple interest refers to the case where interest is paid on the original principal amount of the loan or investment. So, for instance, if a bank offered to pay 5% simple interest on a $1,000 investment, it would pay $50 each year for the life of the investment.

Typically, most banks pay interest compounded either monthly or daily. If interest is compounded monthly, interest earned in the month will be added to the account and will begin earning interest the next month. When a bank quotes an interest rate, they quote it as an annual percentage rate (APR) and a compounding interval (e.g., “compounded daily” or “compounded monthly”).

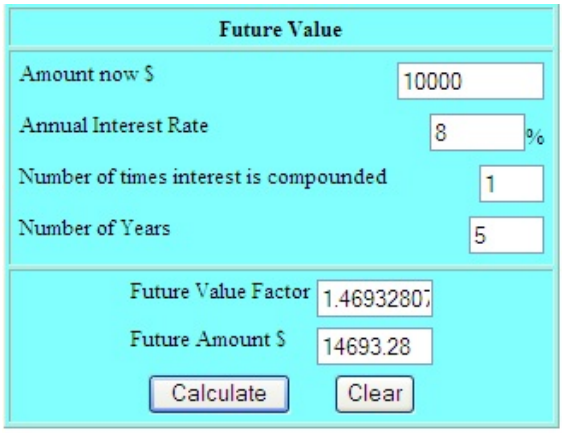
Compare the APR of a bank account that pays 7% interest compounded annually with one that compounds the interest daily. Enter 1 in the amount field of the future value calculator, 7 in the interest field, 1 in the number of years field, and the number of times interest is compounded in a year in the compound field. Click calculate; the annual effective yield appears in the future value factor field. The APR of the account compounded daily is 7.25% compared with a 7% APR for the account that compounds interest annually.



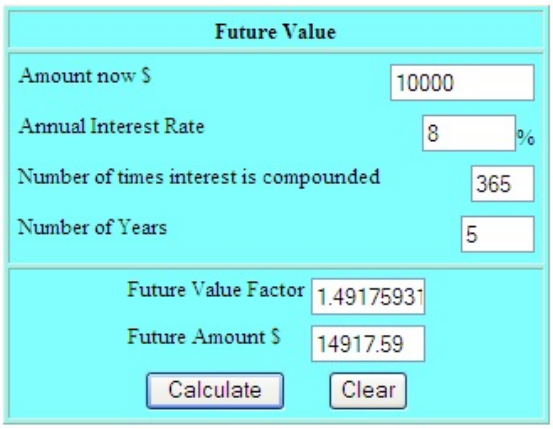


Berry invests $10,000 in a certificate of deposit (CD) for five years paying 8% interest compounded annually. Larry invests in a similar CD, but interest is compounded daily. The number of times interest is compounded in a year is entered in the compound field. Larry's ending balance of $14,918 is $225 higher than Berry's balance of $14,693.

Berry



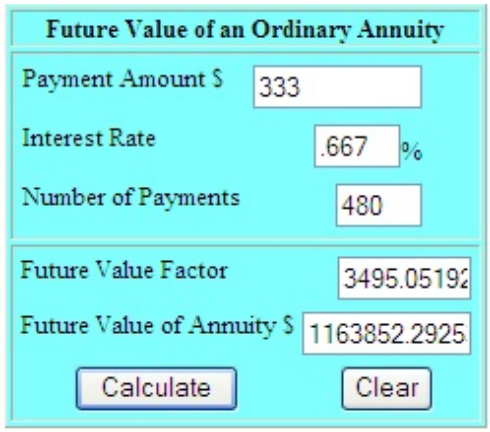
Larry



Compound Interest for an Annuity

In the previous example, we calculated the future value of a single payment using different compounding calculations. The future value table has a field to enter the number of times interest is compounded each year.

We use the future value of an annuity calculator to compute the future value of a series of payments. If interest is compounded more than once a year, we have to adjust the amount entered in the rate field. Divide the annual interest rate by the number of times per year interest is compounded. Let's consider Halpern's investment at the top of the previous page. If he contributed $333.33 per month instead of $4,000 once a year, enter $333.33 in the payment field. The annual interest rate is 8%, but the first monthly contribution will earn interest for only one month before the second contribution is added. Therefore divide the 8% annual interest by 12 (months) to get a monthly interest rate of .667%. The final balance of his account will be $1,163,852, which is $127,626 more than the $1,036,226 balance when he made a single payment per year.



The Miracle of Compound Interest

Marge invested $4,000 per year in her IRA account for eight years, compounding at 8¾. Bob invested $4,000 per year at 8¾% for 32 years, but started investing 8 years later than Marge. Marge contributed $32,000 ($4,000 x 8 years) and Bob contributed $128,000 ($4,000 x 32 years). Bob contributed four times more than Marge, but at the end of 40 years, his ending balance is less than hers. Marge earned $113,890 more interest than Bob earned. Savings grow at an astonishing rate when left to compound for many years. The sooner you begin saving for retirement, the larger your retirement fund will be.

	Marge's Early Funding		Bob's Late Funding	
Year	Contribution	Year-end Value	Contribution	Year-end Value
1	$4,000	$ 4,350	0	0
2	4,000	9,081	0	0
3	4,000	14,226	0	0
4	4,000	19,821	0	0
5	4,000	25,905	0	0
6	4,000	32,522	0	0
7	4,000	39,718	0	0
8	4,000	47,543	0	0
9		51,703	$4,000	$ 4,350
10		56,227	4,000	9,081
11		61,147	4,000	14,226
12		66,497	4,000	19,821
13		72,315	4,000	25,905
14		78,643	4,000	32,522
15		85,524	4,000	39,718
16		93,007	4,000	47,543
17		101,145	4,000	56,053
18		109,995	4,000	65,308
19		119,620	4,000	75,372
20		130,087	4,000	86,317
21		141,470	4,000	98,220
22		153,849	4,000	111,164
23		167,311	4,000	125,241
24		181,951	4,000	140,550
25		197,872	4,000	157,198
26		215,186	4,000	175,303
27		234,015	4,000	194,992
28		254,491	4,000	216,404
29		276,759	4,000	239,689
30		300,975	4,000	265,012
31		327,310	4,000	292,551
32		355,950	4,000	322,499
33		387,096	4,000	355,068
34		420,967	4,000	390,486
35		457,802	4,000	429,004
36		497,860	4,000	470,892
37		541,423	4,000	516,445
38		588,798	4,000	565,984
39		640,318	4,000	619,858
40	**Balance**	**$696,346**	4,000	**$678,446**
	Investment:	$ 32,000	Investment:	$128,000
	Interest:	664,320	Interest:	550,430
	Total:	$696,346	Total:	$678,446

Time Value Problems

Problem 1

What is the present value of $100 payable in one year if the discount rate is 3%? $100 payable in one year if the discount rate is 7%? $100 payable in three years if the discount rate is 7%?

Problem 2

What is the present value of 5 annual $1,000 payments, discounted at 5%?

Problem 3

What is the present of the following payments at an interest rate of 5%: $100 in year 1, $200 in year 2; $300 in year 3? (These payments are not equal so you cannot use the PV of an annuity calculator. Calculate the present value of each payment separately and total the results.)

Problem 4

Which is a more attractive stream of cash flows: $100 per year for 5 years or $600 all in year 5, if the interest rate is 5%?

Problem 5

What is the future value of an investment of $1,000 that earns 5% for 4 years? For 7 years?

Problem 6

How large an investment would be required to produce a future value of $1,000,000 in 10 years, assuming an interest rate of 5%? (The future value is $1,000,000 and you want to compute the present value.)

Problem 7

Allison has $25,000 in her 401(k) plan and will contribute $5,000 each year until she retires in 30 years. Assume the current interest rate is 8%. What will be the value of the 401(k) plan when she retires? Use the following steps to solve the problem

(1) Calculate the future value of the $25,000 currently in the plan at 8% for 30 years.

(2) Calculate the future value of an annuity of 30 $5,000 payments at 8%.

(3) The sum of the two calculations is the value of the 401(k) at retirement.

Problem 8

Which is a higher effective interest rate (APR): 5% APR compounded annually, 4.9% APR compounded monthly, or 4.8% APR compounded daily?

Problem 9

Your client, Harold, is planning for his retirement. His goal is to have a nest egg of $1,500,000 in 30 years. He is going to invest $100,000 today in a CD with an interest rate of 6%. Ten years from now, he will invest an additional lump sum, which will grow at 5% annually. How much must Harold invest ten years from now to reach his goal? Use the following steps to solve the problem:

(1) Determine how much the CD will be worth in 30 years.

(2) Subtract that value from $1.5 million to determine how much additional money he will need from the second investment. That amount represents the future value of an investment for 20 years invested at 5% and you want to determine the present value of that amount.

(3) Enter the amount needed in the amount field of the present value calculator and determine the amount he will have to invest in 10 years to reach his goal.

Problem 10

Same facts as problem 9, except after 10 years, he wants to make 20 annual payments to reach his goal instead of investing a lump sum. How much must he invest each year?

The result of step (2) in problem 9 is the amount of additional funds he needs to reach his $1.5 million goal. This amount represents the future value of the 20 payments he will start making 10 years from now. Use the following steps to calculate the amount he must contribute each year.

(1) Enter 1 in the payment field of the future value of an annuity calculator, 5 in the interest rate field and 20 in the payments field. Click calculate to get the future value factor of 33.066.

(2) Divide the amount additional amount he needs to reach his goal, determined in step 2 of problem 8, by the 33.066 future value factor to calculate the amount of each payment required.