# PVFV.docx The General Time Value Relation for Mixed Cash Flows

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## Part ROR Rate of return concepts

### ROR2 What is geometric and arithmetic average ROR given 4 prices

You bought a security for $30 three months ago. Two months ago its price was $26 , and one month ago it was $52 . Today’s price is $29 . Using both the geometric and arithmetic approaches, what is the average monthly return?

{ANSWER: D ; xlADDRESS: LumpSum!$B$50 ; CLUES: ror1= -13.33%, ror2=100.00%, ror3=-44.23%}

/\a. The geometric average return is -1.3% and the arithmetic average return is 14.1%.

/\b. The geometric average return is -1.0% and the arithmetic average return is 16.3%.

/\c. The geometric average return is -1.3% and the arithmetic average return is 16.3%.

/\d. The geometric average return is -1.1% and the arithmetic average return is 14.1%.

/\e. The geometric average return is -1.0% and the arithmetic average return is 14.1%.

### ROR3a What is geometric average ROR given 3 prices

Two years ago you purchased a stock for $35 . One year ago the price had moved to $16 . Today it is at $57 . What is the geometric annual average rate of return?

{ANSWER: E ; xlADDRESS: LumpSum!$B$66 ; CLUES: ror1=-54.29%, ror2=256.25%}

/\a. 25.1% b. 22.8% c. 20.7% d. 30.4% e. 27.6%

### ROR3b What is arithmetic average ROR given 3 prices

Two years ago you purchased a stock for $35 . One year ago the price had moved to $16 . Today it is at $57 . What is the arithmetic annual average rate of return?

{ANSWER: A ; xlADDRESS: LumpSum!$F$66 ; CLUES: ror1= -54.29%, ror2=256.25%}

/\a. 101.0% b. 147.8% c. 111.1% d. 134.4% e. 122.2%

### ROR3c What is AND(geometric,arithmetic) average ROR given 3 prices

Two years ago you purchased a stock for $35 . One year ago the price had moved to $16 . Today it is at $57 . Which one statement about the annual average rate of return is correct?

{ANSWER: C ; xlADDRESS: LumpSum!$J$66 ; CLUES: ror1= -54.29%, ror2=256.25%}

/\a. The geometric average return is 27.6% and the arithmetic average return is 116.1%.

/\b. The geometric average return is 20.9% and the arithmetic average return is 116.1%.

/\c. The geometric average return is 27.6% and the arithmetic average return is 101.0%.

/\d. The geometric average return is 24.0% and the arithmetic average return is 116.1%.

/\e. The geometric average return is 20.9% and the arithmetic average return is 101.0%.

### ROR4 Find OR(cumulative, geometric average) ROR

You make a $22.0 million investment grow to $70.2 million in 8 years (annual compounding). Which statement about the rate of return is most accurate?

{ANSWER: D ; xlADDRESS: LumpSum!$B$79 ; CLUES: geometric average annual ROR = 15.6%, cumulative ROR = 218.9%}

/\a. the geometric average annual rate of return is 20.6%

/\b. the cumulative rate of return is 15.6%

/\c. the cumulative rate of return is 20.6%

/\d. the geometric average annual rate of return is 15.6%

/\e. the cumulative rate of return is 17.9%

### ROR1 Find AND(cumulative, geometric average) ROR for venture capitalist

A venture capitalists provides a company equity financing of $24.0 million. After 3 years the company repurchases the equity for $41.7 million. There are no other cash flows between the two. Find the average annual geometric rate of return, and also find the cumulative rate of return.

{ANSWER: E ; xlADDRESS: LumpSum!$B$874 }

/\a. the average annual geometric ror is 15.3% and the cumulative ror is 84.7%

/\b. the average annual geometric ror is 17.6% and the cumulative ror is 73.7%

/\c. the average annual geometric ror is 15.3% and the cumulative ror is 73.7%

/\d. the average annual geometric ror is 20.2% and the cumulative ror is 84.7%

/\e. the average annual geometric ror is 20.2% and the cumulative ror is 73.7%

### ROR5 Find ending price given initial price and ROR

Two years ago you purchased a stock for $33 . The annual rates of return during the subsequent two years are 24% and -41%. What is today’s stock price?

{ANSWER: A ; xlADDRESS: LumpSum!$B$92 }

/\a. $24.14 b. $16.49 c. $21.95 d. $18.14 e. $19.95

### ROR6 Find middle value given initial and final one and average ROR (QUADRATIC)

Your broker correctly tells you that your portfolio’s average annual rate of return for the past two years is 4.0%. You know the portfolio value today of $32,600 is $1,400 less than when you started the account two years ago. What was the portfolio’s value one year ago?

{ANSWER: D ; xlADDRESS: LumpSum!$B$106 }

/\a. $42,976 b. $57,201 c. $62,921 d. $47,273 e. $52,001

## Part LS The simple lump sum relation *fv = pv (1+r)n* without intraperiod compounding

### LS6a Find today’s periodic interest of a deposit long ago given annual compounding

A savings account was established with $45,000 exactly 6 years ago. The account earns 6.0% compounded annually. Otherwise, the account has been left alone. When the annual interest is credited to the account today, how much interest is credited?

{ANSWER: C ; xlADDRESS: LumpSum!$B$120 ; CLUES: last year’s FV = $60,220 }

/\a. $4,372 b. $3,975 c. $3,613 d. $2,986 e. $3,285

### LS6b Find next year’s interest-on-interest on a deposit made long ago given annual compounding

A savings account was established with $45,000 exactly 6 years ago. The account earns 6.0% compounded annually. Otherwise, the account has been left alone. Next year, how much interest-on-interest will the account earn?

{ANSWER: C ; xlADDRESS: LumpSum!$F$120 ; CLUES: last year’s FV = $60,220 }

/\a. $1,027 b. $1,243 c. $1,130 d. $934 e. $849

### LS3 Find FV of Manhattan with annual compounding

Exactly 380 years ago immigrants purchased the island of Manhattan from native Americans for $20 . If that sum were invested at 5.5% compounded annually, and the account left-alone, what would be the accumulation today (in $billions)?

{ANSWER: B ; xlADDRESS: LumpSum!$B$134 }

/\a. $16.6 b. $13.7 c. $20.1 d. $15.1 e. $18.2

### LS4a Find FV of a deposit long ago given annual compounding

A deposit exactly 10 years ago of $2,600 earns 10.8% annual interest compounded annually. There have been no other deposits or withdrawals. How much is in the account right now?

{ANSWER: D ; xlADDRESS: LumpSum!$B$149 }

/\a. $7,976 b. $8,773 c. $6,591 d. $7,251 e. $5,992

### LS4b Find total interest of a deposit long ago given annual compounding

A deposit exactly 10 years ago of $2,600 earns 10.8% annual interest compounded annually. There have been no other deposits or withdrawals. As of today, how much total interest has accumulated on the deposit?

{ANSWER: D ; xlADDRESS: LumpSum!$F$149; CLUES: total FV = $7,251 }

/\a. $3,494 b. $4,228 c. $3,843 d. $4,651 e. $3,176

### LS4c Find total interest-on-principal of a deposit long ago given annual compounding

A deposit exactly 10 years ago of $2,600 earns 10.8% annual interest compounded annually. There have been no other deposits or withdrawals. As of today, how much total interest-on-principal has accumulated?

{ANSWER: E ; xlADDRESS: LumpSum!$J$149 ; CLUES: total FV = $7,251 }

/\a. $1,918 b. $2,553 c. $2,110 d. $2,321 e. $2,808

### LS4d Find total interest-on-interest of a deposit long ago given annual compounding

A deposit exactly 10 years ago of $2,600 earns 10.8% annual interest compounded annually. There have been no other deposits or withdrawals. As of today, how much total interest-on-interest has accumulated?

{ANSWER: E ; xlADDRESS: LumpSum!$B$157 ; CLUES: total FV = $7,251 }

/\a. $1,523 b. $2,229 c. $1,675 d. $2,027 e. $1,843

### LS4e Find OR(total interest, total interest-on-interest, total interest-on-interest) of a deposit long ago given annual compounding

A deposit exactly 10 years ago of $2,600 earns 10.8% annual interest compounded annually. There have been no other deposits or withdrawals. As of today, how much total interest has accumulated?

{ANSWER: E ; xlADDRESS: LumpSum!$F$157 ; CLUES: total FV = $7,251 }

/\a. $6,190 b. $5,627 c. $5,116 d. $6,809 e. $4,651

### LS7a Find today's FV given today’s periodic interest on a deposit made long ago with annual compounding

An account was established 14 years ago with an initial deposit. Today the account is credited with annual interest of $581.32 . The interest rate is 7.2% compounded annually. No other deposits or withdrawals have been made. How much is the end-of-day balance?

{ANSWER: E ; xlADDRESS: LumpSum!$B$171 ; CLUES: last year’s FV = $8,074 }

/\a. $7,868 b. $7,153 c. $6,503 d. $5,912 e. $8,655

### LS7b Find PV given today’s periodic interest on a deposit made long ago with annual compounding

An account was established 14 years ago with an initial deposit. Today the account is credited with annual interest of $581.32 . The interest rate is 7.2% compounded annually. No other deposits or withdrawals have been made. How much was the initial deposit?

{ANSWER: C ; xlADDRESS: LumpSum!$F$171 ; CLUES: last year’s FV = $8,074 }

/\a. $2,702 b. $2,233 c. $3,270 d. $2,973 e. $2,457

### LS23 Find price(n) given price(0) and inflation rate

Today your dream car costs $37,500 . You figure that its price inflates at 3.0% per year. The interest rate is 6.1% (compounded annually). Compute the price of the car in 3 years.

{ANSWER: D ; xlADDRESS: LumpSum!$B$930 }

/\a. $45,075 b. $33,866 c. $30,787 d. $40,977 e. $37,252

### LS22 Find deposit today to purchase in future an inflating house price

There is a house that today costs $112,000 and, for peculiar reasons, in exactly 5 years you want to buy the house. You expect that because of inflation the house price will increase 4.6% per year. How much must you deposit today into an account that earns 8.2% per year (compounded annually) such that the future purchase is perfectly financed?

{ANSWER: E ; xlADDRESS: LumpSum!$B$204 ; CLUES: future house price = $140,241 }

/\a. $104,024 b. $125,869 c. $114,426 d. $138,456 e. $94,567

*LS25m Multipart single-setup*

There is a house that today costs $176,000 and, for peculiar reasons, in exactly 7 years you want to buy the house. You expect that because of inflation the house price will increase 7.7% per year. The interest rate is 11.6% per year (compounded annually).

{xlADDRESS: LumpSum!$B$945 }

### LS25am Find precise real rate of return

Find the precise real rate of interest that the account earns.

{ANSWER: A ; xlADDRESS: LumpSum!$B$945 }

/\a. 3.62% b. 2.99% c. 3.98% d. 2.72% e. 3.29%

### LS25bm Find future house price

Find the price of the house at the time of purchase.

{ANSWER: C ; xlADDRESS: LumpSum!$F$945 }

/\a. $393,732 b. $268,924 c. $295,817 d. $357,938 e. $325,398

### LS25cm Find today's deposit

How much must you deposit today into an account such that the future purchase is perfectly financed?

{ANSWER: B ; xlADDRESS: LumpSum!$J$945 }

/\a. $124,733 b. $137,206 c. $113,393 d. $150,927 e. $103,085

### LS26a Find nominal rate in inflation setting given deposit amount

There is a house that today costs $192,000 and, for peculiar reasons, in exactly 8 years you want to buy the house. You expect that because of inflation the house price will increase 3.3% per year. The amount that you intend to deposit today is $139,000 (compounded annually). This deposit should grow so that it perfectly finances the purchase. Find the annual nominal interest rate that the account earns.

{ANSWER: D ; xlADDRESS: LumpSum!$B$961 }

/\a. 10.1% b. 6.9% c. 8.3% d. 7.6% e. 9.1%

### LS26b Find precise real rate in inflation setting given deposit amount

There is a house that today costs $192,000 and, for peculiar reasons, in exactly 8 years you want to buy the house. You expect that because of inflation the house price will increase 3.3% per year. The amount that you intend to deposit today is $139,000 (compounded annually). This deposit should grow so that it perfectly finances the purchase. Find the precise real annual interest rate that the account earns.

{ANSWER: D ; xlADDRESS: LumpSum!$F$961 }

/\a. 5.5% b. 5.0% c. 4.5% d. 4.1% e. 6.0%

### LS26c find real and nominal

There is a house that today costs $192,000 and, for peculiar reasons, in exactly 8 years you want to buy the house. You expect that because of inflation the house price will increase 3.3% per year. The amount that you intend to deposit today is $139,000 (compounded annually). This deposit should grow so that it perfectly finances the purchase. Find the precise nominal and real annual interest rates that the account earns.

{ANSWER: E ; xlADDRESS: LumpSum!$J$961 }

/\a. The nominal rate is 6.6% and the precise real rate is 4.7%

/\b. The nominal rate is 6.6% and the precise real rate is 4.1%

/\c. The nominal rate is 8.7% and the precise real rate is 4.7%

/\d. The nominal rate is 7.6% and the precise real rate is 4.7%

/\e. The nominal rate is 7.6% and the precise real rate is 4.1%

### LS24 Inflation and verbal description of proper discounting

You wish to purchase in 10 years an item that today costs $2,300 . The cost is expected to inflate at an annual rate of 3.4%. You make a deposit today that perfectly finances the future purchase. The observed interest rate that your savings earns is 9.8%. Describe the relation between your deposit, inflation, and the discount rate.

{ANSWER: B ; xlADDRESS: LumpSum!$B$35 }

/\a. the deposit equals the real cost of $2300 discounted at the nominal rate 9.8%

/\b. the deposit equals the real cost of $2300 discounted at the real rate 6.19%

/\c. the real interest rate is 9.8%

/\d. Two choices, A and C, are correct

/\e. The three A-B-C choices are all correct

### LS8 Find PV long ago given today's FV, r, and N with annual compounding

Today you sell your stock fund for $39,200 . You bought it 13 years ago and otherwise the account has been left alone. The stocks have earned a 16.3% average annual rate of return. How much did you buy the stocks for?

{ANSWER: C ; xlADDRESS: LumpSum!$B$217 }

/\a. $5,004 b. $6,661 c. $5,505 d. $4,550 e. $6,055

### LS9 Find today's PV that will be a future liability (FV) given r, and N with monthly rate and compounding

In exactly 17 months a bill of $3,560 is due. Today you deposit money such that if the account earns 1.11% per month, the bill is perfectly financed. How much do you deposit?

{ANSWER: A ; xlADDRESS: LumpSum!$B$230 }

/\a. $2,951 b. $3,571 c. $4,320 d. $3,246 e. $3,928

### LS11 Find PV given today’s periodic interest with annual compounding

Exactly 8 years ago your uncle deposited money into an account that earns 5.8% per year. Otherwise, he has left the account alone. Just today the most recent year’s interest of $645 was credited to the account. How much was the initial deposit?

{ANSWER: A ; xlADDRESS: LumpSum!$B$243 ; CLUES: last year’s FV = $11,114 }

/\a. $7,490 b. $9,063 c. $6,190 d. $6,809 e. $8,239

### LS1 Compare two PV choices and find best one

You are trying to choose whether today you should buy investment A or B. With investment A, you’ll receive $8,000 in 11 years. With investment B, you’ll pay $7,539 today and receive $12,000 in 9 years. If your sole objective is to choose the investment that promises the largest annual rate of return, which statement is most accurate?

{ANSWER: C ; xlADDRESS: LumpSum!$B$258 ; CLUES: ror for B = 5.30%; PV of A at that ROR = $4,533 }

/\a. Investment A is best if A costs anything more than $5026

/\b. Investment B is best if A costs anything more than $3717

/\c. Investment B is best if A costs anything more than $4533

/\d. Investment A is best if A costs anything less than $5026

/\e. Investment A is best if A costs the same as B.

### LS2 Find optimal switch horizon given annual compounding

You are entering a creative financing arrangement that involves two different transactions. For the first transaction you will borrow $17,900 at an interest rate of 8.20% compounded annually. For the second transaction you will invest the borrowed money today in a security that promises a future pay-off of $49,870 . Upon receiving the pay-off from the second transaction, you will repay in-full the loan from the first transaction. Which statement is most accurate?

{ANSWER: E ; xlADDRESS: LumpSum!$B$273 }

/\a. If the security's pay-off occurs in 15 years or less , but not one year more, then the arrangement is profitable.

/\b. If the security's pay-off occurs in 15 years or more, but not one year less, then the arrangement is profitable.

/\c. If the security's pay-off occurs in 11 years or less , but not one year more, then the arrangement is profitable.

/\d. If the security's pay-off occurs in 11 years or more, but not one year less, then the arrangement is profitable.

/\e. If the security's pay-off occurs in 13 years or less , but not one year more, then the arrangement is profitable.

### LS5 Find target N given PV, FV, and r with annual compounding

You have $3,000 to invest and, when the investment liquidates, you expect to get back $7,507 . The geometric average annual rate of return for your investment is 5.9% per year. How many years is it until liquidation?

{ANSWER: E ; xlADDRESS: LumpSum!$B$287 }

/\a. 15 b. 18 c. 17 d. 14 e. 16

### LS12 Find N on an investment given today's PV and tomorrow's FV and r

Today you purchase some international mutual funds for $6,160 . You read that they should earn a 8.9% average annual rate of return throughout the foreseeable future. If you leave the account alone, how many years should it take to accumulate funds worth $20,300 ?

{ANSWER: C ; xlADDRESS: LumpSum!$B$300 }

/\a. 13 b. 17 c. 14 d. 19 e. 15

### LS13 Find N given PV long ago and today's FV, and r

A newspaper reports that a mid-level manager today has stocks worth $74,100 . The person bought the stocks with $8,600 from a summer job while in college. No other purchases or sales have been made. The stocks have earned an average annual return of 15.4%. How many years ago did she buy the stocks?

{ANSWER: D ; xlADDRESS: LumpSum!$B$313 }

/\a. 16 b. 14 c. 17 d. 15 e. 18

### LS14 Find N given this year's periodic interest, long ago's PV, and r

Today your account was credited with its annual interest of $10,930 . The account was established some time ago with a $25,750 initial deposit. No other deposits or withdrawals have been made. The account earns 11.5% annual interest. How many years ago was the account established?

{ANSWER: C ; xlADDRESS: LumpSum!$B$326 }

/\a. 14 b. 12 c. 13 d. 10 e. 11

### LS15 Find N given lifetime accumulated interest, long ago's PV, and r

Some time ago a $96,600 initial deposit opened an account. No other deposits or withdrawals have been made. Today the annual interest was credited to the account. Total lifetime interest now equals $81,355 . The account earns 6.3% annual interest. How many years ago was the account established?

{ANSWER: C ; xlADDRESS: LumpSum!$B$339 }

/\a. 14 b. 13 c. 10 d. 11 e. 12

### LS16 Find r given long ago's PV, today's FV and N

Exactly 6 years ago you put $7,400 in an investment account. No other deposits or withdrawals have been made. Today the account was credited with its annual interest so that its balance now is $9,917 . What is the annual average rate of return for the account?

{ANSWER: A ; xlADDRESS: LumpSum!$B$352 }

/\a. 5.00% b. 5.50% c. 4.55% d. 3.76% e. 4.13%

### LS17 Find r given today's PV, a target FV and N

Today you are buying some stocks for $12,980 . In 8 years you would like the account to have accumulated $26,250 . What is the desired annual average rate of return for the account?

{ANSWER: C ; xlADDRESS: LumpSum!$B$365 }

/\a. 8.36% b. 12.25% c. 9.20% d. 11.13% e. 10.12%

### LS18 Find r given the paintings original PV, today's FV and N

Exactly 12 years ago an investor purchased a classical painting for $14,340 . Today the painting probably can be sold for $30,880 . What is the annual average rate of return on the investment?

{ANSWER: A ; xlADDRESS: LumpSum!$B$378 }

/\a. 6.60% b. 7.26% c. 6.00% d. 5.45% e. 7.99%

### LS19 Find r given doubling period

A sum of money doubles in 16 years. What is the annual average rate of return?

{ANSWER: D ; xlADDRESS: LumpSum!$B$391 }

/\a. 5.36% b. 3.66% c. 4.02% d. 4.43% e. 4.87%

### LS20 Find r given today's FV and this year's periodic interest

Today your account was credited with its annual interest of $132 , thereby bringing the balance to $2,100 . What is the account’s annual interest rate?

{ANSWER: C ; xlADDRESS: LumpSum!$B$404 }

/\a. 7.37% b. 8.92% c. 6.70% d. 8.11% e. 9.81%

### LS10a Find actual FV given target FV, N, target r, and actual r

In exactly 19 months a bill of $16,000 is due. Today you deposit money such that if the account earns a target rate of return of 0.64% per month, the bill is perfectly financed. Unfortunately, your account earns 35 basis points less than your target. When the bill is due, how much money do you lack?

{ANSWER: B ; xlADDRESS: LumpSum!$B$420 ; CLUES: PV = $14,174 }

/\a. $770 b. $1,025 c. $700 d. $932 e. $847

### LS10b Find actual r given target FV, N, target r, and actual FV

In exactly 19 months a bill of $16,000 is due. Today you deposit money such that if the account earns a target rate of return of 0.64% per month, the bill is perfectly financed. Unfortunately, your account does not actually earn the target rate of return, and when the bill is due you lack $1,025 . What was the actual monthly rate of return?

{ANSWER: B ; xlADDRESS: LumpSum!$F$420 ; CLUES: PV = $14,174 }

/\a. 0.24% b. 0.29% c. 0.26% d. 0.32% e. 0.22%

### LS10c Find actual r given target FV, N, target r, and actual FV; WORD CHOICES

In exactly 19 months a bill of $16,000 is due. Today you deposit money such that if the account earns a target rate of return of 0.64% per month, the bill is perfectly financed. In actuality, your account does not earn the target rate of return. When the bill is due your account has $1,025 less than the bill. Which statement about the monthly rate of return is true?

{ANSWER: D ; xlADDRESS: LumpSum!$J$420 ; CLUES: PV = $14,174 }

/\a. the actual monthly rate of return is 30 basis points less than the target

/\b. the actual monthly rate of return is 40 basis points less than the target

/\c. the actual monthly rate of return is 30 basis points more than the target

/\d. the actual monthly rate of return is 35 basis points less than the target

/\e. the actual monthly rate of return is 40 basis points more than the target

### LS21a Find r given target FV, actual FV, and N

In exactly 21 months a bill of $7,790 is due. Today you deposit money such that if the account earns a target rate of return of 1.27% per month, the bill is perfectly financed. No other deposits or withdrawals have been made. Your account actually accumulates $7,169 . What was the actual average monthly rate of return?

{ANSWER: B ; xlADDRESS: LumpSum!$B$434 ; CLUES: PV = $5,976 }

/\a. 0.72% b. 0.87% c. 0.79% d. 0.65% e. 0.96%

### LS21b Find r given target FV, actual FV, and N; WORD CHOICES

In exactly 21 months a bill of $7,790 is due. Today you deposit money such that if the account earns a target rate of return of 1.27% per month, the bill is perfectly financed. No other deposits or withdrawals have been made. Your account actually accumulates $7,169 . What is the relation between the actual and target average monthly rates of return?

{ANSWER: E ; xlADDRESS: LumpSum!$F$434 ; CLUES: PV = $5,976 }

/\a. the actual average monthly rate of return is 35 basis points bigger than the target

/\b. the actual average monthly rate of return is 30 basis points smaller than the target

/\c. the actual average monthly rate of return is 35 basis points smaller than the target

/\d. the actual average monthly rate of return is 40 basis points bigger than the target

/\e. the actual average monthly rate of return is 40 basis points smaller than the target

## Part CY Intraperiod compounding problems

### CY18 Find interest on interest with lump sum relation from college job

One summer exactly 10 years ago you invested $2,700 in an account that has paid 8.6% annual interest compounded monthly. You have totally ignored the existence of the account. How much interest-on-interest has accumulated in the account?

{ANSWER: C ; xlADDRESS: LumpSum!$B$18 ; CLUE: FV = $6,361 }

/\a. $1,217 b. $1,006 c. $1,339 d. $1,107 e. $1,473

### CY19 Find interest savings on simple balance

You have a “home equity loan” with a principal balance of $67,500 . The annual interest rate (compounded monthly) is 10.30% and, because of an unusual short-term liquidity crunch, your payment throughout the past 6 months has included only interest. A friend tells you that a competing bank charges only 8.30% on similar loans. Furthermore, she says your bank will match the lower rate if you go in and complain. How much interest would you have saved throughout the past 6 months if you had paid the lower instead of higher interest rate?

{ANSWER: E ; xlADDRESS: GeneralPV!$B$30 }

/\a. $898 b. $817 c. $614 d. $743 e. $675

### CY14a Find today’s interest with intraperiod compounding

A savings account was established with $4,600 exactly 11 years ago. The account earns annual interest at 10.1% compounded monthly. Otherwise, the account has been left alone. When the periodic interest is credited to the account today, how much interest is credited?

{ANSWER: E ; xlADDRESS: LumpSum!$B$449; CLUES: last year’s FV = $13,791 }

/\a. $105.52 b. $87.21 c. $95.93 d. $79.28 e. $116.08

### CY14b Find next year’s interest with intraperiod compounding

A savings account was established with $4,600 exactly 11 years ago. The account earns annual interest at 10.1% compounded monthly. Otherwise, the account has been left alone. Over the next year, how much interest-on-interest will the account earn?

{ANSWER: D ; xlADDRESS: LumpSum!$F$449; CLUES: last year’s FV = $13,791 }

/\a. $1,108 b. $1,340 c. $915 d. $1,007 e. $1,218

### CY12 Find actual FV given target FV, N, target r, and actual r; (intraperiod)

In exactly 9 years you expect to receive $9,030 from an investment. Today you borrow money from an associate such that if interest accrues at an annual rate of 8.00% compounded quarterly, the investment exactly repays the loan. Unfortunately, the associate charges you 117 basis points per annum more than expected. You must pay the higher rate. In 9 years when the investment returns $9,030 and you repay the loan, how much money do you lack?

{ANSWER: E ; xlADDRESS: LumpSum!$B$462 ; CLUES: PV = $4,427 }

/\a. $1,079 b. $1,186 c. $810 d. $891 e. $981

### CY6a Find FV with intraperiod compounding

A deposit exactly 14 years ago of $1,100 earns 8.8% annual interest compounded quarterly.. There have been no other deposits or withdrawals. How much is in the account right now?

{ANSWER: B ; xlADDRESS: LumpSum!$B$478 }

/\a. $4,502 b. $3,721 c. $3,383 d. $3,075 e. $4,093

### CY6b Find total interest with intraperiod compounding

A deposit exactly 14 years ago of $1,100 earns 8.8% annual interest compounded quarterly. There have been no other deposits or withdrawals. As of today, how much total interest has accumulated on the deposit?

{ANSWER: E ; xlADDRESS: LumpSum!$F$478 ; CLUES: total FV = $3,721 }

/\a. $2,883 b. $3,837 c. $3,488 d. $3,171 e. $2,621

### CY6c Find total interest-on-principal with intraperiod compounding

A deposit exactly 14 years ago of $1,100 earns 8.8% annual interest compounded quarterly. There have been no other deposits or withdrawals. As of today, how much total interest-on-principal has accumulated?

{ANSWER: A ; xlADDRESS: LumpSum!$J$478 ; CLUES: total FV = $3,721 }

/\a. $1,355 b. $1,232 c. $1,804 d. $1,640 e. $1,491

### CY6d Find total interest-on-interest with intraperiod compounding

A deposit exactly 14 years ago of $1,100 earns 8.8% annual interest compounded quarterly. There have been no other deposits or withdrawals. As of today, how much total interest-on-interest has accumulated?

{ANSWER: D ; xlADDRESS: LumpSum!$B$486; CLUES: total FV = $3,721 }

/\a. $1,685 b. $1,531 c. $1,392 d. $1,266 e. $1,151

### CY6e Find OR(total interest, total interest-on-interest, total interest-on-interest) with intraperiod compounding

A deposit exactly 14 years ago of $1,100 earns 8.8% annual interest compounded quarterly. There have been no other deposits or withdrawals. As of today, how much total interest-on-interest has accumulated?

{ANSWER: E ; xlADDRESS: LumpSum!$F$486 ; CLUES: total FV = $3,721 }

/\a. $1,685 b. $1,531 c. $1,151 d. $1,392 e. $1,266

### CY20 bond

Today you invest $1,000 in a bond fund that promises to pay 8.8% per year compounded semiannually. You instruct the fund to reinvest the semiannual interest so that it remains in the account. The account sits there accumulating interest, otherwise ignored. After 30 years you check the account balance. How much total interest-on-interest has accumulated?

{ANSWER: C ; xlADDRESS: LumpSum!$B$888; CLUES: fv= $13,244 ; interest-on-principal = $2,640 }

/\a. $8,731 b. $7,216 c. $9,604 d. $7,937 e. $10,565

### CY15a Find FV given today’s interest with intraperiod compounding

An account was established 4 years ago with an initial deposit. Today the account is credited with its periodic interest of $258.93 . The annual interest rate is 10.2% compounded quarterly. No other deposits or withdrawals have been made. How much is the end-of-day balance?

{ANSWER: B ; xlADDRESS: LumpSum!$B$501 ; CLUES: last year’s FV = $10,154 }

/\a. $13,860 b. $10,413 c. $11,454 d. $12,600 e. $15,246

### CY15b Find PV given today’s interest with intraperiod compounding

An account was established 4 years ago with an initial deposit. Today the account is credited with its periodic interest of $258.93 . The annual interest rate is 10.2% compounded quarterly. No other deposits or withdrawals have been made. How much was the initial deposit?

{ANSWER: A ; xlADDRESS: LumpSum!$F$501 ; CLUES: last year’s FV = $10,154 }

/\a. $6,960 b. $7,656 c. $8,422 d. $6,327 e. $9,264

### CY11a Find actual FV given target FV, N, target r, and actual r (intraperiod compounding)

In exactly 10 years a bill of $8,460 is due. Today you deposit money such that if the account earns a target rate of return of 12.80% per annum, compounded monthly, the bill is perfectly financed. Unfortunately, your account earns an annual rate of return that is 15 basis points less than your target. When the bill is due, how much money do you lack?

{ANSWER: D ; xlADDRESS: LumpSum!$B$518 ; CLUES: PV = $2,368 }

/\a. $113 b. $137 c. $103 d. $125 e. $151

### CY11b Find actual r given target FV, N, target r, and actual FV

In exactly 10 years a bill of $8,460 is due. Today you deposit money such that if the account earns a target rate of return of 12.80% per annum, compounded monthly, the bill is perfectly financed. Unfortunately, your account does not actually earn the target rate of return, and when the bill is due you lack $125 . What was the actual annual rate of return?

{ANSWER: E ; xlADDRESS: LumpSum!$F$518 ; CLUES: PV = $2,368 }

/\a. 13.92% b. 10.45% c. 9.50% d. 11.50% e. 12.65%

### CY11c Find actual r given target FV, N, target r, and actual FV; WORD CHOICES

In exactly 10 years a bill of $8,460 is due. Today you deposit money such that if the account earns a target rate of return of 12.80% per annum, compounded monthly, the bill is perfectly financed. In actuality, your account does not earn the target rate of return. When the bill is due your account has $125 less than the bill. Which statement about the annual rate of return is true?

{ANSWER: A ; xlADDRESS: LumpSum!$J$518 ; CLUES: PV = $2,368 }

/\a. the actual annual rate of return is 15 basis points less than the target

/\b. the actual annual rate of return is 17 basis points less than the target

/\c. the actual annual rate of return is 20 basis points more than the target

/\d. the actual annual rate of return is 20 basis points less than the target

/\e. the actual annual rate of return is 15 basis points more than the target

### CY13 Find PV given today’s periodic interest with intraperiod compounding

Exactly 6 years ago your uncle deposited money into an account that earns 4.2% per year, compounded quarterly. Otherwise, he has left the account alone. Just today the most recent period’s interest of $69 was credited to the account. How much was the initial deposit?

{ANSWER: C ; xlADDRESS: LumpSum!$B$532 ; CLUES: last period’s FV =$6,599 }

/\a. $5,709 b. $6,908 c. $5,190 d. $6,280 e. $7,599

### CY7 Find PV given N, r, and intraperiod compounding on a saving's bond

Today you plan to cash in savings bonds for $1,900 . You bought them exactly 16 years ago. The savings bonds have earned a 7.5% annual rate of return compounded monthly. How much did you pay for the savings bonds?

{ANSWER: E ; xlADDRESS: LumpSum!$B$547 }

/\a. $632 b. $765 c. $841 d. $695 e. $574

### CY8 Find PV given a future liability, N, r, and intraperiod compounding

In 6 years you must transfer $6,900 to associates. Today you invest sufficient money such that if it earns 11.3% per annum, compounded monthly, you’ll accumulate the required funds. How much do you invest?

{ANSWER: A ; xlADDRESS: LumpSum!$B$562 }

/\a. $3,514 b. $4,252 c. $3,865 d. $3,194 e. $4,677

### CY22 Supplier’s discount and best deal (numerical choices)

Suppliers A and Z sell an identical product, but payment plans vary. Supplier A offers a discount of 1.8% if payment occurs within 40 days. Otherwise, A requires payment of their full price, $156,000 , within 70 days. Full price from supplier Z is $159,100 and a discount of 2.5% is offered if paid within 45 days. Otherwise, full payment is due within 80 days. The company financing rate is 13.5% (compounded daily). Which payment plan is best?

{ANSWER: A ; xlADDRESS: LumpSum!$B$190 }

/\a. buy at a discount from A to get the lowest present value of cost of $150,943

/\b. buy at a discount from A to get the lowest present value of cost of $173,584

/\c. buy at a discount from Z to get the lowest present value of cost of $173,584

/\d. buy at a discount from Z to get the lowest present value of cost of $150,943

/\e. buy at a discount from Z to get the lowest present value of cost of $131,255

### CY21 Supplier’s discount and best deal (boolean choices w/o numbers)

Suppliers X and Z are competing to sell your company supplies. The full price of supplies from supplier X is $2,100 and they offer these payment plans: 4.0% discount if you pay within 25 days, otherwise pay full price within 155 days. The full price with supplier Z is $2,180 and they offer these payment plans: 4.8% discount if you pay within 25 days, otherwise pay full price within 175 days. Your company financing rate is 13.8% compounded daily. Find the supplier and payment plan that represent the lowest present value of cost.

{ANSWER: D ; xlADDRESS: LumpSum!$B$916; CLUES: PV(discounted price, full price), for X($1,997 ,$1,980 ) and for Z($2,056 ,$2,040 ) }

/\a. If you buy from supplier X the lowest present value of cost occurs when you pay the full price on day 155

/\b. If you buy from supplier Z the lowest present value of cost occurs when you pay the discounted price on day 25

/\c. The lowest possible present value of cost occurs when you pay the full price from supplier X

/\d. Two choices, A and C, are correct

/\e. The three A-B-C choices are all correct

### CY16 Find N given periodic interest, long ago's PV, and r

Today your account was credited with its periodic interest of $545.46 . The account was established some time ago with a $24,500 initial deposit. No other deposits or withdrawals have been made. The account earns annual interest of 6.1% compounded quarterly. How many years ago was the account established?

{ANSWER: B ; xlADDRESS: LumpSum!$B$576 }

/\a. 5 1/4 b. 6 2/4 c. 6 d. 5 e. 4 2/4

### CY17 Find N given lifetime interest, long ago's PV, and r

Some time ago an initial deposit of $126,000 opened an account. No other deposits or withdrawals have been made. Today the periodic interest was credited to the account. Total lifetime interest now equals #########. The account earns annual interest of 11.0% compounded monthly. How many years ago was the account established?

{ANSWER: E ; xlADDRESS: LumpSum!$B$590 }

/\a. 22 b. 29 2/4 c. 26 3/4 d. 24 1/4 e. 20

### CY9 Find N given today's PV, total lifetime interest, and r

Today you invest $6,150 that earns 6.2% per annum compounded monthly. If you leave the account alone, how many years should it take to accumulate $4,974 of total interest?

{ANSWER: B ; xlADDRESS: LumpSum!$B$605 }

/\a. 12 3/4 b. 9 2/4 c. 11 2/4 d. 14 e. 10 2/4

### CY2 Find optimal switch point given quarterly compounding

You are entering a creative financing arrangement that involves two different transactions. For the first transaction you will borrow $11,800 at an annual interest rate of 10.40% compounded quarterly. For the second transaction you will invest the borrowed money today in a security that promises a future pay-off of $18,260 . Upon receiving the pay-off from the second transaction, you will repay in-full the loan from the first transaction. Which statement is most accurate?

{ANSWER: E ; xlADDRESS: LumpSum!$B$620 }

/\a. If the security's pay-off occurs in 3 1/4 years or more, but not one quarter less, then the arrangement is profitable.

/\b. If the security's pay-off occurs in 3 1/4 years or less, but not one quarter more, then the arrangement is profitable.

/\c. If the security's pay-off occurs in 3 3/4 years or more, but not one quarter less, then the arrangement is profitable.

/\d. If the security's pay-off occurs in 3 3/4 years or less, but not one quarter more, then the arrangement is profitable.

/\e. If the security's pay-off occurs in 4 1/4 years or less, but not one quarter more, then the arrangement is profitable.

### CY3a Find APR given doubling period and intraperiod compounding

A sum of money earns sufficient interest such that the balance doubles in 8 years. Given that it is compounded monthly, what is the annual percentage rate?

{ANSWER: B ; xlADDRESS: LumpSum!$B$636 }

/\a. 6.53% b. 8.70% c. 7.91% d. 5.94% e. 7.19%

### CY3b Find EAR given doubling period and intraperiod compounding

A sum of money earns sufficient interest such that the balance doubles in 8 years. Given that it is compounded monthly, what is the effective annual rate?

{ANSWER: C ; xlADDRESS: LumpSum!$F$636 }

/\a. 13.25% b. 12.05% c. 9.05% d. 9.96% e. 10.95%

### CY3c Find OR(APR,EAR) given doubling period and intraperiod compounding

A sum of money earns sufficient interest such that the balance doubles in 8 years. Given that it is compounded monthly, what is the annual percentage rate?

{ANSWER: C ; xlADDRESS: LumpSum!$J$636 }

/\a. 7.91% b. 5.94% c. 8.70% d. 7.19% e. 6.53%

### CY3d Find AND(APR,EAR) given doubling period and intraperiod compounding

A sum of money earns sufficient interest such that the balance doubles in 8 years. Given that it is compounded monthly, which statement about the annual interest rate is most accurate?

{ANSWER: B ; xlADDRESS: LumpSum!$N$636 }

/\a. the annual percentage rate is 10.00% and the effective annual rate is 9.05%

/\b. the annual percentage rate is 8.70% and the effective annual rate is 9.05%

/\c. the annual percentage rate is 10.00% and the effective annual rate is 7.87%

/\d. the annual percentage rate is 8.70% and the effective annual rate is 7.87%

/\e. the annual percentage rate is 11.50% and the effective annual rate is 9.05%

### CY4 Compare EAR on loans given terms

You can either borrow money from a bank X at 8.85% compounded daily, or from bank Y at 8.73% compounded monthly. Which of the following statements is most accurate?

{ANSWER: C ; xlADDRESS: LumpSum!$B$650 ; CLUES: EARX = 9.25% ; EARY = 9.09%}

/\a. Since its effective annual rate is 21 basis points smaller, you would prefer to borrow from bank Y

/\b. Since its effective annual rate is 21 basis points bigger, you would prefer to borrow from bank Y.

/\c. Since its effective annual rate is 16 basis points smaller, you would prefer to borrow from bank Y.

/\d. Since its effective annual rate is 16 basis points bigger, you would prefer to borrow from bank Y.

/\e. Since its effective annual rate is 19 basis points smaller, you would prefer to borrow from bank Y.

### CY5a Is it worth switching the CD (word answers)

You just signed a paper committing $40,000 to a 15-year investment that pays 9.50% annual interest compounded semiannually. Now you learn that an alternative investment has no minimum investment amount, and pays interest compounded monthly for 15-years. Maybe you would like to get back your money on the original investment, and switch to the alternative. You can cash in your original investment right now, but perhaps you would have to pay a penalty. Which of the following statements about this scenario is most accurate?

{ANSWER: D ; xlADDRESS: LumpSum!$B$669 CLUES: Given a penalty of $40 , the breakeven monthly rate is 9.33%. Given a monthly rate of 9.45%, the breakeven penalty is $782 }

/\a. If the penalty is $782 and the interest rate is 9.45% or more compounded monthly, then it always is worth switching.

/\b. If the penalty is $55 and the interest rate is 9.33% or more compounded monthly, then it always is worth switching.

/\c. If there is no penalty then interest rates of 9.32% compounded monthly and 9.5% compounded semiannually lead to financially equivalent outcomes.

/\d. Two choices, A and C, are correct

/\e. None of the A-B-C choices are correct

### CY5b Is it worth switching the CD (find breakeven penalty)

You just signed a paper committing $40,000 to a 15-year investment that pays 9.50% annual interest compounded semiannually. Now you learn that an alternative investment has no minimum investment amount, and pays 9.45% compounded monthly for 15-years. Maybe you would like to get back your money on the original investment, and switch to the alternative. You can cash in your original investment right now, but you would have to pay a penalty. Find the penalty at which the two alternatives lead to financially equivalent outcomes.

{ANSWER: C ; xlADDRESS: LumpSum!$G$669 }

/\a. $946 b. $646 c. $782 d. $711 e. $860

### CY5c Is it worth switching the CD (find breakeven rate)

You just signed a paper committing $40,000 to a 15-year investment that pays 9.50% annual interest compounded semiannually. Now you learn that an alternative investment has no minimum investment amount, and pays interest compounded monthly for 15-years. Maybe you would like to get back your money on the original investment, and switch to the alternative. You can cash in your original investment right now, but you would have to pay a $40 penalty. What is the annual percentage rate for the deal with monthly compounding at which the two alternatives lead to financially equivalent outcomes?

{ANSWER: A ; xlADDRESS: LumpSum!$K$669 }

/\a. 9.33% b. 13.66% c. 11.29% d. 10.26% e. 12.42%

### CY1 Credit card effective annual rate

What is the effective annual rate (EAR) for a credit card whose annual percentage rate is 15.90% compounded monthly?

{ANSWER: D ; xlADDRESS: LumpSum!$B$681 }

/\a. 18.82% b. 15.56% c. 22.78% d. 17.11% e. 20.70%

### CY10a Find r given target FV, actual FV, and N (intraperiod compounding

In exactly 22 years a bill of $30,120 is due. Today you deposit money such that if the account earns a target rate of return of 6.30% per annum, compounded quarterly, the bill is perfectly financed. No other deposits or withdrawals have been made. Your account actually accumulates $41,121 . What was the actual average annual percentage rate?

{ANSWER: B ; xlADDRESS: LumpSum!$B$696 ; CLUES: PV = $7,614 }

/\a. 10.30% b. 7.74% c. 11.33% d. 8.51% e. 9.37%

### CY10b Find r given target FV, actual FV, and N (intraperiod compounding); WORD CHOICES

In exactly 22 years a bill of $30,120 is due. Today you deposit money such that if the account earns a target rate of return of 6.30% per annum, compounded quarterly, the bill is perfectly financed. No other deposits or withdrawals have been made. Your account actually accumulates $41,121 . What is the relation between the actual and target average annual rates of return?

{ANSWER: B ; xlADDRESS: LumpSum!$F$696 ; CLUES: PV = $7,614 }

/\a. the actual average monthly rate of return is 190 basis points bigger than the target

/\b. the actual average monthly rate of return is 144 basis points bigger than the target

/\c. the actual average monthly rate of return is 166 basis points bigger than the target

/\d. the actual average monthly rate of return is 144 basis points smaller than the target

/\e. the actual average monthly rate of return is 190 basis points smaller than the target

## Part MC Mixed cash flow streams

### MC12 Find FV long after making the last of two irregular and different deposits

Suppose you deposit $1,000 today, and then 4 months from today you deposit $1,200 Except for these two deposits you leave the account alone. The account pays you 7.4% annual interest compounded monthly. What is the account balance exactly one year from today?

{ANSWER: C ; xlADDRESS: GeneralPV!$B$131 }

/\a. $1,756 b. $1,931 c. $2,337 d. $2,125 e. $1,596

### MC1a Find FV of 3 consecutive but different annual deposits

You invest $1,480 today. One year from today you invest $2,280 . Finally, two years from today you invest $560 . There are no other deposits or withdrawals. Your account earns 5.2% annual interest (compounded annually). How much is in the account immediately after the last deposit?

{ANSWER: A ; xlADDRESS: LumpSum!$B$711 }

/\a. $4,596 b. $3,453 c. $3,799 d. $4,179 e. $3,139

### MC1b Find FV of 3 consecutive but different annual deposits a year after last deposit

You invest $1,480 today. One year from today you invest $2,280 . Finally, two years from today you invest $560 . There are no other deposits or withdrawals. Your account earns 5.2% annual interest (compounded annually). How much is in the account three years from today?

{ANSWER: B ; xlADDRESS: LumpSum!$F$711 }

/\a. $5,851 b. $4,835 c. $4,396 d. $3,996 e. $5,319

### MC1c Find total interest on 3 consecutive but different annual deposits

You invest $1,480 today. One year from today you invest $2,280 . Finally, two years from today you invest $560 . There are no other deposits or withdrawals. Your account earns 5.2% annual interest (compounded annually). Immediately after the last deposit is made, how much total interest will the account have earned?

{ANSWER: E ; xlADDRESS: LumpSum!$J$711 }

/\a. $208 b. $189 c. $228 d. $251 e. $276

### MC2a Find FV of 3 irregular and different monthly deposits

You deposit $1,300 today. In exactly 5 months you deposit $930 . Finally, exactly 9 months from today you deposit $580 . There are no other deposits or withdrawals. Your account earns annual interest of 8.0% compounded monthly. How much is in the account immediately after the last deposit is made?

{ANSWER: B ; xlADDRESS: LumpSum!$B$726 }

/\a. $2,650 b. $2,915 c. $2,190 d. $3,207 e. $2,409

### MC2b Find FV in one year of 3 irregular and different monthly deposits

You deposit $1,300 today. In exactly 5 months you deposit $930 . Finally, exactly 9 months from today you deposit $580 . There are no other deposits or withdrawals. Your account earns annual interest of 8.0% compounded monthly. How much is in the account in exactly one year?

{ANSWER: A ; xlADDRESS: LumpSum!$F$726 }

/\a. $2,974 b. $3,598 c. $3,958 d. $4,354 e. $3,271

### MC3 Find today's PV of 3 irregular and different monthly future expenses

You forecast bills of $680 in one month, $1,290 in 6 months, and $1,975 in 8 months. You wish to make a deposit today that perfectly finances the bills. Your account earns annual interest of 10.6% compounded monthly. How much is today’s deposit?

{ANSWER: C ; xlADDRESS: LumpSum!$B$741 }

/\a. $4,112 b. $4,524 c. $3,739 d. $5,474 e. $4,976

### MC4 Find today's PV of 2 irregular and different annual expenses

You forecast bills of $1,440 in one year and $930 in 5 years. You wish to make a deposit today that perfectly finances the bills. Your account earns 11.5% interest compounded annually. How much is today’s deposit?

{ANSWER: E ; xlADDRESS: LumpSum!$B$755 }

/\a. $1,513 b. $1,665 c. $2,216 d. $2,014 e. $1,831

*Multiple setup (MC5m)*

Here are two future expenses that you want to save for today: $5,200 payable in 4 years, and $8,400 payable in 9 years. You make an investment today that perfectly finances the future expenses if the investment earns a target 16.9% average annual rate of return (compounded annually).

{xlADDRESS: LumpSum!$B$771 }

### MC5am Find present value for 2 mixed cash flows

How much is your investment?

{ANSWER: B ; xlADDRESS: LumpSum!$B$771 }

/\a. $6,449 b. $4,845 c. $5,862 d. $7,093 e. $5,329

### MC5bm Find interim balance for a mixed 2 cash flow stream

When it is time to pay the first expense, you make the expected withdrawal from the account. After that withdrawal, what is the account balance?

{ANSWER: C ; xlADDRESS: LumpSum!$F$771 }

/\a. $3,180 b. $4,656 c. $3,848 d. $4,233 e. $3,498

### MC5cm Find the shortfall given 2 irregular and different future expenses, target r and actual r

The investment indeed grows sufficiently to finance your first expense. Unfortunately, for the entire investment horizon your actual annual rate of return falls short of the target by 230 basis points per year. When it is time to pay the second expense, how much money do you lack?

{ANSWER: A ; xlADDRESS: LumpSum!$J$771 }

/\a. $2,161 b. $1,624 c. $1,476 d. $1,964 e. $1,786

### MC13 Find shortfall for second bill given OR(quarterly,monthly) compounding

Here are two future expenses that you want to save for today: $4,600 payable in 5 years, and $7,800 payable in 10 years. You make an investment today that perfectly finances the future expenses if the investment earns a target 12.2% average annual rate of return (compounded monthly). The investment indeed grows sufficiently to finance your first expense. Unfortunately, for the entire investment horizon your actual annual rate of return falls short of the target by 150 basis points per year. When it is time to pay the second expense, how much money do you lack?

{ANSWER: E ; xlADDRESS: LumpSum!$B$977; CLUES: PV= $4,824 ; balance after CF1= $3,617 }

/\a. $1,489 b. $1,354 c. $1,231 d. $1,802 e. $1,638

### MC6a Find actual CF given target CF, target ROR, and actual ROR for mixed stream

An investment promises two cash flows: $1,900 payable in 12 months, and $4,000 payable in 19 months. You purchase the investment at a price that promises a target annual rate of return of 16.9% compounded monthly. After the investment horizon concludes, however, the actual rate of return differs from the target because the second cash flow is different than promised (the first cash flow is exactly as promised). If the actual annual rate of return is 13.7% compounded monthly, how much was the second cash flow?

{ANSWER: B ; xlADDRESS: LumpSum!$B$787 ; CLUES: pv = $4,673 }

/\a. $4,118 b. $3,744 c. $4,530 d. $4,983 e. $3,404

### MC6b Find actual CF given target CF, target ROR, and actual ROR for mixed stream

An investment promises two cash flows: $1,900 payable in 12 months, and $4,000 payable in 19 months. You purchase the investment at a price that promises a target annual rate of return of 16.9% compounded monthly. After the investment horizon concludes, however, the actual rate of return differs from the target because the second cash flow is different than promised (the first cash flow is exactly as promised). The actual annual rate of return is 13.7% compounded monthly. How does the actual second cash flow compare to the promised second cash flow?

{ANSWER: C ; xlADDRESS: LumpSum!$F$787 ; CLUES: pv = $4,673 }

/\a. the actual second cash flow is $256 larger than promised

/\b. the actual second cash flow is $294 smaller than promised

/\c. the actual second cash flow is $256 smaller than promised

/\d. the actual second cash flow is $223 larger than promised

/\e. the actual second cash flow is $223 smaller than promised

### MC7 Find ROR for an investment given its mixed annual stream

An investment that costs $1,440 promises to return $1,610 in one year and $1,470 in two years. What is the average annual rate of return?

{ANSWER: E ; xlADDRESS: LumpSum!$B$801 }

/\a. 64.9% b. 78.5% c. 95.0% d. 86.4% e. 71.4%

*Multiple setup (MC8m)*

A potential investment promises returns of $1,280 in one month, $1,080 in two months, and $1,600 in three months. In order to earn your target annual percentage rate of return (monthly compounding), you offer to purchase the investment for $3,600 .

{xlADDRESS: LumpSum!R809C1 }

### MC8am Find ROR given an investments mixed monthly stream and target ROR

What is the target annual percentage rate of return (monthly compounding) if you buy at the offer price and receive the promised returns?

{ANSWER: C ; xlADDRESS: LumpSum!$B$817 }

/\a. 68.6% b. 75.5% c. 56.7% d. 51.6% e. 62.4%

### MC8bm Find effect on ROR of an investments higher than expected cost given the mixed monthly stream, target offer, and counteroffer

The seller rejects your offer, but counter-offers at $3,800 . If you buy at the higher counter-offer price and receive the promised returns, by how many basis points does the annual percentage rate of return decline?

{ANSWER: D ; xlADDRESS: LumpSum!$F$817 }

/\a. 2964 b. 2694 c. 3945 d. 3260 e. 3586

### MC9 Find annual ROR given today's deposit and 2 irregular and different monthly cash flows

You forecast expenses of $4,000 payable in 2 months and $3,700 payable in 8 months. You make a deposit today of $7,000 that should perfectly finance the future expenditures. What annual percentage rate of return (compounded monthly) does the account earn?

{ANSWER: C ; xlADDRESS: LumpSum!$B$831 }

/\a. 35.28% b. 32.07% c. 24.10% d. 29.16% e. 26.51%

### MC10 Find annual ROR given today's PV and 3 irregular and different monthly cash flows

You forecast expenses of $5,700 payable in 4 months, $3,000 payable in 7 months, and $3,900 payable in 16 months. You make a deposit today of $11,450 that should perfectly finance the future expenditures. What annual percentage rate of return (compounded monthly) does the account earn?

{ANSWER: E ; xlADDRESS: LumpSum!$B$846 }

/\a. 9.5% b. 10.5% c. 11.5% d. 12.7% e. 14.0%

### MC11 Find annual ROR given target ROR, monthly mixed cash flows, and terminal value

You forecast expenses of $5,500 payable in 5 years and $3,600 payable in 9 years. You make a deposit today that would perfectly finance the future expenditures if the investment were to earn a target 10.1% annual percentage rate of return (compounded annually). Instead, however, at the time of the last expense there is a shortfall of $2,290 . What was the actual annual percentage rate of return for the investment?

{ANSWER: A ; xlADDRESS: LumpSum!$B$861 ; CLUES: pv = $4,914 }

/\a. 5.9% b. 7.1% c. 6.5% d. 8.6% e. 7.8%

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