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Title Discounting and Compounding Calculations for Various Scenarios

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Imports Rdpack

RdMacros Rdpack

Description Functions for compounding and discounting calculations included here serve as a complete reference for various scenarios of time value of money.
Raymond M. Brooks ("Financial Management," 2018, ISBN: 9780134730417).
Sheridan Titman, Arthur J. Keown, John D. Martin ("Financial Management: Principles and Applications," 2017, ISBN: 9780134417219).
Jonathan Berk, Peter DeMarzo, David Stangeland, Andras Marosi ("Fundamentals of Corporate Finance," 2019, ISBN: 9780134735313).
S. A. Hummelbrunner, Kelly Halliday, Ali R. Hassanlou ("Contemporary Business Mathematics with Canadian Applications," 2020, ISBN: 9780135285015).

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R topics documented:

computingN	*Calculates the required Number of Years for a specific given Present Value to become equal to an amount that of a given Future Value at given Discount Rate.*

Description

Calculates the required Number of Years for a specific given Present Value to become equal to an amount that of a given Future Value at given Discount Rate.

Usage

```
computingN(r, pv, fv)
```

Arguments

r	A number.
pv	A number.
fv	A number.

Details

As per an in-depth discussion about computational aspects of time value of money scenarios, Berk,J. et al. (2019) points out that most of the time value of money situations involve computation of Present Value or Future Value. However, in case a deposit is made into a bank account, it may require calculating how long it will take before the balance reaches a certain level. To add to this, Brooks,R. (2018) interestingly explains the rule of thumb that financiers developed which was known as the Rule of 72. This rule still works quite accurately for interest rates between 2 percent and 30 percent. As per the Rule of 72, just divide 72 by the interest rate to find the length of time it takes to double your money. For example, to double your money at the interest rate of 8 percent, it shall approximately take 9 (72 divided by 8) years. Further, he supports this with his findings that the Rule of 72 is fairly accurate for the middle range of interest rates. It overestimates the time it takes to double below 8 percent and underestimates over 8 percent. However, to accurately solve for required number of years (n) and for a specific given Present Value to become equal to an amount that of a given Future Value at given Discount Rate, the method computingN() is developed. This method computingN() gives n (required number of years) when values are passed to its three arguments. Here r is annual rate, pv is Present Value and fv is Future Value. The output gives value of n,the number of years that are rounded off to three decimal places. So, an output of 6.637 means 6.637 Years.

Value

Input values to three arguments r , pv and fv.

Author(s)

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References

Berk,J., DeMarzo,P., Stangeland,D.A., Marosi,A. (2019). *Fundamentals of Corporate Finance (3rd Edition)*. Pearson Education Canada. ISBN 9780134735313, https://bookshelf.vitalsource.com/books/9780135219546.

Brooks,R. (2018). *Financial Management (4th Edition)*. Pearson Education (US). ISBN 9780134730417, https://bookshelf.vitalsource.com/books/9780134731070.

Examples

```
computingN(0.08,-1200,2000)
computingN(0.08,1200,-2000)
computingN(0.08,1200,2000)
```

---

computingROR	*Calculates the required Rate of Return for a specific given amount of Present Value to become equal to that of a given amount of Future Value in given Number of Years.*

Description

Calculates the required Rate of Return for a specific given amount of Present Value to become equal to that of a given amount of Future Value in given Number of Years.

Usage

```
computingROR(n, pv, fv)
```

Arguments

n	A number.
pv	A number.
fv	A number.

Details

Berk,J. et al. (2019) defines rate of return as the rate at which the value of an amount invested grows to fund the future cash flow(s) of an investment. In some situations, this rate of return has to be computed when the Present Value and Future Value are known and the interest rate (or rate of return) that equates to Present and Future Value needs to be computed. Brooks,R. (2018) elaborates on the ten important points about the Time Value of Money equation belonging to a single cash flow. Here, Brooks,R. (2018) states that the equation essentially has four variables (r, n, pv and fv), and three out of these four variables must be known before you can solve for the missing or unknown variable. The method computingROR() computes required rate of return (r) for a specific given amount of Present Value (pv) to become equal to that of a given amount of Future Value (fv) in given number of years (n). So, computingROR() gives r (interest rate or required rate of return) when values are passed to its three arguments. Here, n is number of Years, pv is Present value and fv is Future Value. The output gives value of r, the Required Rate of Return that is rounded off to three decimal places. So, an output of 0.186 means a return of 18.6 percent.

Value

Input values to three arguments n , pv and fv.

Author(s)

MaheshP Kumar, <maheshparamjitkumar@gmail.com>

References

Berk,J., DeMarzo,P., Stangeland,D.A., Marosi,A. (2019). *Fundamentals of Corporate Finance (3rd Edition)*. Pearson Education Canada. ISBN 9780134735313, `https://bookshelf.vitalsource.com/books/9780135219546`.

Brooks,R. (2018). *Financial Management (4th Edition)*. Pearson Education (US). ISBN 9780134730417, `https://bookshelf.vitalsource.com/books/9780134731070`.

Examples

```
computingROR(3,-1200,2000)
computingROR(3,1200,-2000)
computingROR(3, 1200,2000)
```

```
fvContinuousCompSingleCF
```
Calculates Future Value of a Single Cash Flow for Continuous Compounding.

Description

Calculates Future Value of a Single Cash Flow for Continuous Compounding.

Usage

```
fvContinuousCompSingleCF(r, n, pv)
```

Arguments

r	A number.
n	A number.
pv	A number.

Details

According to Titman,S. et al. (2017), when interest is earned on both the initial principal and the reinvested interest during prior periods, the result is called Compound Interest. This process of accumulating interest on an investment over multiple time periods is called Compounding. As the number of compounding periods per year increases so does the effective annual rate (EAR). This is so because the greater the number of compounding periods is, the more often interest is earned on interest. Based on this, you can easily compute the EAR when interest is compounded daily (that is compounded 365 times). We can just as easily calculate the EAR if the interest is compounded every hour (that is compounded 8,760 times), every minute (that is compounded 525,600 times), or every second (that is compounded 31,536,000 times). We can even calculate the EAR when interest is continuously compounded, that is, when the time intervals between interest payments are infinitely small. The method `fvContinuousCompSingleCF()` is developed to calculate Future Value of a Single Cash Flow under continuous compounding and gives you a future value when

values are passed to its three arguments. Here, r is annual rate, n is number of years and pv is Present Value. The output gives Future Value of a Single Cash Flow under continuous compounding, that is rounded off to two decimal places. A minus value like -206.09 represents Outflow of the Cash. Whereas a positive value like 206.09 represents an Inflow of the cash.

Value

Input values to three arguments r , n and pv.

Author(s)

MaheshP Kumar, <maheshparamjitkumar@gmail.com>

References

Titman,S., Keown,A.J., Martin,J.D. (2017). *Financial Management: Principles and Applications(13th Edition)*. Pearson Education (US). ISBN 9780134417219, https://bookshelf.vitalsource.com/books/9780134418001.

Examples

```
fvContinuousCompSingleCF(0.015,2,200)
fvContinuousCompSingleCF(0.015,2,-200)
```

---

fvDailyCompSingleCF   *Calculates Future Value of a Single Cash Flow for Daily compounding.*

Description

Calculates Future Value of a Single Cash Flow for Daily compounding.

Usage

```
fvDailyCompSingleCF(r, n, pv)
```

Arguments

r	A number.
n	A number.
pv	A number.

Details

As described by Titman,S. et al. (2017), Time Value of Money calculations are essentially comparisons between Present Value, that is what a cash flow is worth to you today, and Future Value, that is what a cash flow will be worth in the future. In addition, this Future Value is impacted by the frequency of compounding. In most of the situations the compounding period is an year in length. However, this is not always true. For instance, when banks offer saving accounts that Compound Interest every day, month, or quarter. Depositor in this scenario should prefer more frequent compounding because more interest is earned when more is compounded more frequently. Most common compounding situation includes daily, monthly, quarterly, and yearly compounding. Based on this, method `fvDailyCompSingleCF()` calculates Future Value of a Single Cash Flow for daily compounding scenario. The method `fvDailyCompSingleCF()` gives `fv` when values are passed to its three arguments. Here `r`, is annual rate, `n` is number of years and `pv` is Present Value. The output gives Future Value of a Single Cash Flow for daily compounding scenario, that is rounded off to two decimal places. A minus value like -4450.69 represents Outflow of the Cash. Whereas a positive value like 4450.69 represents an Inflow of the cash.

Value

Input values to three arguments `r` , `n` and `pv`.

Author(s)

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References

Titman,S., Keown,A.J., Martin,J.D. (2017). *Financial Management: Principles and Applications(13th Edition)*. Pearson Education (US). ISBN 9780134417219, https://bookshelf.vitalsource.com/books/9780134418001.

Examples

```
fvDailyCompSingleCF(0.08,10,-2000)
fvDailyCompSingleCF(0.08,10,2000)
```

---

fvMonthlyCompSingleCF	*Computing Future Value of a Single Cash Flow under Monthly Compounding Frequency.*

Description

Computing Future Value of a Single Cash Flow under Monthly Compounding Frequency.

Usage

```
fvMonthlyCompSingleCF(r, n, pv)
```

Arguments

r	A number.
n	A number.
pv	A number.

Details

According to Brooks,R. (2018), when you deposit money in a certificate of deposit (CD) at a bank, the bank is technically borrowing or renting money from you with a promise to repay that money with interest. Let us assume that you purchase a CD for $500 with a promised annual percentage rate of 5 percent. The annual percentage rate (APR) is the yearly rate that you earn by investing or in other words, this is a charge for borrowing. Although the financial institution quotes the 5 percent interest rate on an annual basis, these institutions in fact often pay interest quarterly, monthly, or even daily. The period in which the financial institution applies interest is the Compounding Period, and the number of times it adds interest to an account each year is the Compounding Periods per Year. The method fvMonthlyCompSingleCF() computes Future Value (fv) of a Single Cash Flow under Monthly Compounding Frequency and gives fv when values are passed to its three arguments. Here r is annual rate, n is number of years and pv is Present Value.

Value

Input values to three arguments r , n and pv.

Author(s)

MaheshP Kumar, <maheshparamjitkumar@gmail.com>

References

Brooks,R. (2018). *Financial Management (4th Edition)*. Pearson Education (US). ISBN 9780134730417, https://bookshelf.vitalsource.com/books/9780134731070.

Examples

```
fvMonthlyCompSingleCF(0.08,10,2000)
fvMonthlyCompSingleCF(0.08,10,-2000)
```

---

fvMonthlyPaidAnnuityCompMonthly

Calculates Future Value of Monthly Paid Ordinary Annuity or Annuity Due that is Compounded Monthly.

Description

Calculates Future Value of Monthly Paid Ordinary Annuity or Annuity Due that is Compounded Monthly.

Usage

```
fvMonthlyPaidAnnuityCompMonthly(r, n, pmt, bgn)
```

Arguments

r	A number.
n	A number.
pmt	A number.
bgn	A number.

Details

Explaining the variables involved in Time Value of Money equation, Brooks,R. (2018) points out that variables in a single cash flow (the lump-sum time value) of money equations are number of periods, r (Interest Rate or Rate of Return), pv (Present Value), and fv (Future Value), whereas annuity equation has an additional variable and that is pmt (payment). The method fvMonthlyPaidAnnuityCompMonthly() calculates Future Value of Monthly Paid Ordinary Annuity or Annuity Due that is Compounded Monthly and gives fv when values are passed to its four arguments. Here r is annual rate, n is number of years, pmt is amount of one annuity and bgn is the computational mode. (Enter 1 when annuity payment occurs at the beginning of the period; 0 for end of period payments)

Value

Input values to four arguments r , n , pmt and bgn.

Author(s)

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References

Brooks,R. (2018). *Financial Management (4th Edition)*. Pearson Education (US). ISBN 9780134730417, https://bookshelf.vitalsource.com/books/9780134731070.

Examples

```
fvMonthlyPaidAnnuityCompMonthly(0.08,10,-50,1)
fvMonthlyPaidAnnuityCompMonthly(0.08,10,-50,0)
fvMonthlyPaidAnnuityCompMonthly(.08,10,50,1)
fvMonthlyPaidAnnuityCompMonthly(.08,10,50,0)
```

fvQuarterlyCompSingleCF

Computing Future Value of a Single Cash Flow for Quarterly Compounding Frequency.

Description

Computing Future Value of a Single Cash Flow for Quarterly Compounding Frequency.

Usage

```
fvQuarterlyCompSingleCF(r, n, pv)
```

Arguments

r	A number.
n	A number.
pv	A number.

Details

According to Brooks,R. (2018),Future Value is the value of an asset at a specific point in time in the future that is equivalent in value to a specific amount today. So there exists a direct relationship between the Future Value of an asset and the asset's Present Value, growth rate and time to the future point. Future values grow faster due to the fact that interest also keeps on earning interest, a phenomenon called Compounding of Interest. The method `fvQuarterlyCompSingleCF()` is developed to compute Future Value of a Single Cash Flow for Quarterly Compounding Frequency.The method gives Future Value when values are passed to its three arguments. Here `r` is annual rate, `n` is number of years and `pv` is Present Value.

Value

Input values to three arguments `r` , `n` and `pv`.

Author(s)

MaheshP Kumar, <maheshparamjitkumar@gmail.com>

References

Brooks,R. (2018). *Financial Management (4th Edition)*. Pearson Education (US). ISBN 9780134730417, https://bookshelf.vitalsource.com/books/9780134731070.

Examples

```
fvQuarterlyCompSingleCF(0.08,10,2000)
fvQuarterlyCompSingleCF(0.08,10,-2000)
```

fvQuarterlyPaidAnnuityCompQuarterly

Calculates Future Value of Quarterly Paid Ordinary Annuity or Annuity Due that is Compounded Quarterly.

Description

Calculates Future Value of Quarterly Paid Ordinary Annuity or Annuity Due that is Compounded Quarterly.

Usage

```
fvQuarterlyPaidAnnuityCompQuarterly(r, n, pmt, bgn)
```

Arguments

r	A number.
n	A number.
pmt	A number.
bgn	A number.

Details

According to Brooks,R. (2018), an Annuity is a series of equal cash payments at regular intervals across time. The method `fvQuarterlyPaidAnnuityCompQuarterly()` is developed to calculate Future Value of Quarterly-Paid Ordinary Annuity or Annuity Due that is Compounded Quarterly. The method gives FV when values are passed to its four arguments. Here `r` is annual rate, `n` is number of years, `pmt` is amount of one annuity and `bgn` is the mode (1 when annuity payment occurs at the beginning of the period; 0 for end of period payments)

Value

Input values to four arguments `r` , `n` , `pmt` and `bgn`.

Author(s)

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References

Brooks,R. (2018). *Financial Management (4th Edition)*. Pearson Education (US). ISBN 9780134730417, https://bookshelf.vitalsource.com/books/9780134731070.

Examples

```
fvQuarterlyPaidAnnuityCompQuarterly(0.08,10,-50,1)
fvQuarterlyPaidAnnuityCompQuarterly(0.08,10,-50,0)
fvQuarterlyPaidAnnuityCompQuarterly(.08,10,50,1)
fvQuarterlyPaidAnnuityCompQuarterly(.08,10,50,0)
```

---

fvSemiAnnualCompSingleCF

Computing Future Value of a Single Cash Flow for Semi-Annual Compounding Frequency.

Description

Computing Future Value of a Single Cash Flow for Semi-Annual Compounding Frequency.

Usage

```
fvSemiAnnualCompSingleCF(r, n, pv)
```

Arguments

r	A number.
n	A number.
pv	A number.

Details

The method `fvSemiAnnualCompSingleCF()` is developed to Compute Future Value of a Single Cash Flow under Semi-Annual Compounding Frequency.The method gives FVFuture Value when values are passed to its three arguments. Here `r` is annual rate, `n` is number of years and `pv` is Present Value.

Value

Input values to three arguments `r` , `n` and `pv`.

Author(s)

MaheshP Kumar, <maheshparamjitkumar@gmail.com>

References

Hummelbrunner,S.A., Halliday,K., Hassanlou,A.R. (2020). *Contemporary Business Mathematics with Canadian Applications (12th Edition)*. Pearson Education Canada. ISBN 9780135285015, https://bookshelf.vitalsource.com/books/9780135406380.

Examples

```
fvSemiAnnualCompSingleCF(0.08,10,2000)
fvSemiAnnualCompSingleCF(0.08,10,-2000)
```

---

fvSemiAnnuallyPaidAnnuityCompSemiAnnually
Calculates Future Value of Semi-Annual Paid Ordinary Annuity or Annuity Due that is Compounded Semi-Annually.

Description

Calculates Future Value of Semi-Annual Paid Ordinary Annuity or Annuity Due that is Compounded Semi-Annually.

Usage

```
fvSemiAnnuallyPaidAnnuityCompSemiAnnually(r, n, pmt, bgn)
```

Arguments

r	A number.
n	A number.
pmt	A number.
bgn	A number.

Details

According to Hummelbrunner,S.A. et al. (2020), an Annuity is a series of payments, usually of equal size, made at periodic time intervals. Various types of annuities are identified based on the term of an annuity, the date of payment and the length of the interest compounding or conversion period. The term Annuity applies to all periodic payment plans, the most frequent of which require annual, semi-annual, quarterly, or monthly payments. Practical applications of annuities are widely encountered in the finances of both businesses and individuals. Periodic contributions to student loan payments, car loan payments, and mortgage payments are common examples of Annuities in personal finance. Businesses may encounter Annuities in the form of equipment loans, mortgages, lease contracts and bond interest payments. The method fvSemiAnnuallyPaidAnnuityCompSemiAnnually() is developed to calculates Future Value of Semi-Annually Paid Ordinary Annuity or Annuity Due that is Compounded Semi-Annually. The method gives Future Value when values are passed to its four arguments. Here r is annual rate, n is number of years, pmt is amount of one annuity and bgn is the mode (1 when annuity payment occurs at the beginning of the period; 0 for end of period payments)

Value

Input values to four arguments r , n , pmt and bgn.

Author(s)

MaheshP Kumar, `<maheshparamjitkumar@gmail.com>`

References

Hummelbrunner,S.A., Halliday,K., Hassanlou,A.R. (2020). *Contemporary Business Mathematics with Canadian Applications (12th Edition).* Pearson Education Canada. ISBN 9780135285015, <https://bookshelf.vitalsource.com/books/9780135406380>.

Examples

```
fvSemiAnnuallyPaidAnnuityCompSemiAnnually(0.08,10,-50,1)
fvSemiAnnuallyPaidAnnuityCompSemiAnnually(0.08,10,-50,0)
fvSemiAnnuallyPaidAnnuityCompSemiAnnually(.08,10,50,1)
fvSemiAnnuallyPaidAnnuityCompSemiAnnually(.08,10,50,0)
```

---

fvVariousCompSingleCF	*Calculates Future Value of Single Cash Flow for various Compounding Frequencies.*

Description

Calculates Future Value of Single Cash Flow for various Compounding Frequencies.

Usage

```
fvVariousCompSingleCF(r, n, pv, cfreq)
```

Arguments

r	A number.
n	A number.
pv	A number.
cfreq	A number.

Details

The method fvVariousCompSingleCF() is developed to calculate Future Value of Single Cash Flow for various Compounding Frequencies. The gives Future Value when values are passed to its four arguments. Here r is annual rate, n is number of years, pv is Present Value and cfreq is Compounding Frequency value that must be either 1 or 2 or 4 or 12 or 365.

Value

Input values to four arguments r , n , pv and cfreq.

Author(s)

MaheshP Kumar, <maheshparamjitkumar@gmail.com>

References

Hummelbrunner,S.A., Halliday,K., Hassanlou,A.R. (2020). *Contemporary Business Mathematics with Canadian Applications (12th Edition)*. Pearson Education Canada. ISBN 9780135285015, https://bookshelf.vitalsource.com/books/9780135406380.

Examples

```
fvVariousCompSingleCF( 0.08,10,2000,2)
fvVariousCompSingleCF( 0.08,10,2000,4)
fvVariousCompSingleCF( 0.08,10,2000,12)
fvVariousCompSingleCF( 0.08,10,2000,365)
```

---

fvYearlyAnnuityCompAnnually

Calculates Future Value of Yearly Paid Ordinary Annuity or Annuity Due that is Compounded Annually.

Description

Calculates Future Value of Yearly Paid Ordinary Annuity or Annuity Due that is Compounded Annually.

Usage

```
fvYearlyAnnuityCompAnnually(r, n, pmt, bgn)
```

Arguments

r	A number.
n	A number.
pmt	A number.
bgn	A number.

Details

According to Hummelbrunner,S.A. et al. (2020), classification of Annuities is done by the date of payment. In an Ordinary Annuity, the function processes the payments as an end-of-period payment. Whereas, in an Annuity Due, the function processes the payments as a beginning-of-period payment. Further Brooks,R. (2018) explains that he future value of an annuity can be determined by multiplying the payment or deposit with the Future Value Interest Factor of an annuity. The method, fvYearlyAnnuityCompAnnually() is developed to calculate Future Value of Yearly-Paid Ordinary Annuity or Annuity Due that is Compounded Annually.The method gives Future Value when values are passed to its four arguments. Here r is annual rate, n is number of years, pmt is amount of one annuity and bgn is the computational mode (Enter 1 when annuity payment occurs at the beginning of the period; 0 for end of period payments).

Value

Input values to four arguments `r` , `n` , `pmt` and `bgn`.

Author(s)

MaheshP Kumar, <maheshparamjitkumar@gmail.com>

References

Brooks,R. (2018). *Financial Management (4th Edition)*. Pearson Education (US). ISBN 9780134730417, https://bookshelf.vitalsource.com/books/9780134731070.

Hummelbrunner,S.A., Halliday,K., Hassanlou,A.R. (2020). *Contemporary Business Mathematics with Canadian Applications (12th Edition)*. Pearson Education Canada. ISBN 9780135285015, https://bookshelf.vitalsource.com/books/9780135406380.

Examples

```
fvYearlyAnnuityCompAnnually(0.11,4,-300,0)
fvYearlyAnnuityCompAnnually(0.11,4,-300,1)
fvYearlyAnnuityCompAnnually(0.11,4,300,0)
fvYearlyAnnuityCompAnnually(0.11,4,300,1)
```

---

fvYearlyAnnuityCompDaily

Calculates Future Value of Yearly Paid Ordinary Annuity or Annuity Due that is Compounded Daily.

Description

Calculates Future Value of Yearly Paid Ordinary Annuity or Annuity Due that is Compounded Daily.

Usage

```
fvYearlyAnnuityCompDaily(r, n, pmt, bgn)
```

Arguments

r	A number.
n	A number.
pmt	A number.
bgn	A number.

Details

On the topic of making Interest Rates comparable, Titman,S. et al. (2017), remarks that sometimes it is difficult to determine exactly how much you are paying or earning on a loan. That is so because the loan might be quoted not as compounding annually but rather as compounding quarterly or daily. If there are two loans say, one that is quoted as 8.084 percent compounded annually and one that is quoted as 7.85 percent compounded quarterly, then these are difficult to compare because the interest on one is compounded annually (you pay or receive interest just once a year) but the interest on the other is compounded quarterly (you pay or receive interest four times a year). To allow borrowers to compare rates between different lenders, what is known as the annual percentage rate (APR) must be clearly specified in the deal document. The annual percentage rate (APR) indicates the interest rate paid or earned in one year without compounding. We can calculate APR as the interest rate per period (for example, per month or week) multiplied by the number of periods during which compounding occurs during the year. So an interest rate of 2 percent per month would mean 24 percent per year. APR does not help much when the rates being compared are not compounded for the same number of periods per year. In fact, the APR is also called the nominal or quoted (stated) interest rate because it is the rate that the lender states the borrower is paying. In the previous example, both 8.084 percent and 7.85 percent are the APRs, but these are not comparable because the loans have different compounding periods. To make the two rates comparable, we need to calculate their equivalent rates using an annual compounding period. We do this by calculating the effective annual rate (also known as effective annual yield), and the annually compounded rate that produces the same return as the nominal or stated rate. So in the method `fvYearlyAnnuityCompDaily()` is developed to be used in a scenario similar to the one mentioned above. The method `fvYearlyAnnuityCompDaily()` internally computes and uses effective Annual rate(yield) for yearly payments that are compounded daily and then gives you Future Value of yearly-paid Ordinary Annuity or Annuity Due that is Compounded daily, when values are passed to its four arguments. Here `r` is annual rate, `n` is number of years, `pmt` is amount of one annuity and `bgn` is the computational mode. (Enter 1 when annuity payment occurs at the beginning of the period; 0 for end of period payments).

Value

Input values to four arguments `r` , `n` , `pmt` and `bgn`.

Author(s)

MaheshP Kumar, <maheshparamjitkumar@gmail.com>

References

Titman,S., Keown,A.J., Martin,J.D. (2017). *Financial Management: Principles and Applications(13th Edition)*. Pearson Education (US). ISBN 9780134417219, https://bookshelf.vitalsource.com/books/9780134418001.

Examples

```
fvYearlyAnnuityCompDaily(0.11,4,-300,0)
fvYearlyAnnuityCompDaily(0.11,4,-300,1)
fvYearlyAnnuityCompDaily(0.11,4,300,0)
fvYearlyAnnuityCompDaily(0.11,4,300,1)
```

---

fvYearlyAnnuityCompMonthly

> *Calculates Future Value of Yearly Paid Ordinary Annuity or Annuity Due that is Compounded Monthly.*

Description

Calculates Future Value of Yearly Paid Ordinary Annuity or Annuity Due that is Compounded Monthly.

Usage

```
fvYearlyAnnuityCompMonthly(r, n, pmt, bgn)
```

Arguments

r	A number.
n	A number.
pmt	A number.
bgn	A number.

Details

According to Hummelbrunner,S.A. et al. (2020) Annuity is a series of equal payments, made at periodic intervals. The length of time between the successive payments is called the payment interval or payment period. The length of time from the beginning of the first payment interval to the end of the last payment interval is called the term of an annuity. The amount of each of the regular payments is called the periodic payment or periodic rent. The method fvYearlyAnnuityCompMonthly()is developed to calculate Future Value of Yearly-Paid Ordinary Annuity or Annuity Due that is Compounded Monthly.The method gives Future Value when values are passed to its four arguments. Here r is annual rate, n is number of years, pmt is amount of one annuity and bgn is the computational mode. (Enter 1 when annuity payment occurs at the beginning of the period; 0 for end of period payments)

Value

Input values to four arguments r , n , pmt and bgn.

Author(s)

MaheshP Kumar, <maheshparamjitkumar@gmail.com>

References

Hummelbrunner,S.A., Halliday,K., Hassanlou,A.R. (2020). *Contemporary Business Mathematics with Canadian Applications (12th Edition)*. Pearson Education Canada. ISBN 9780135285015, https://bookshelf.vitalsource.com/books/9780135406380.

Examples

```
fvYearlyAnnuityCompMonthly(0.11,4,-300,0)
fvYearlyAnnuityCompMonthly(0.11,4,-300,1)
fvYearlyAnnuityCompMonthly(0.11,4,300,0)
fvYearlyAnnuityCompMonthly(0.11,4,300,1)
```

---

fvYearlyAnnuityCompQuarterly
                     Calculates Future Value of Yearly Paid Ordinary Annuity or Annuity
                     Due that is Compounded Quarterly.

Description

Calculates Future Value of Yearly Paid Ordinary Annuity or Annuity Due that is Compounded Quarterly.

Usage

```
fvYearlyAnnuityCompQuarterly(r, n, pmt, bgn)
```

Arguments

r	A number.
n	A number.
pmt	A number.
bgn	A number.

Details

According to Hummelbrunner,S.A. et al. (2020), Annuities are classified by the date of payment. In an Ordinary Annuity, payments are made at the end of each payment period. In an Annuity Due, payments are made at the beginning of each payment period. Loan payments, mortgage payments, and interest payments on bonds are all examples of Ordinary Annuities. Examples of annuities due include lease rental payments on real estate or equipment. The method `fvYearlyAnnuityCompQuarterly()`is developed to calculate Future Value of Yearly-Paid Ordinary Annuity or Annuity Due that is Compounded Quarterly. The method gives Future Value when values are passed to its four arguments. Here `r` is annual rate, `n` is number of years, `pmt` is amount of one annuity and `bgn` is the computational mode. (Enter 1 when annuity payment occurs at the beginning of the period; 0 for end of period payments

Value

Input values to four arguments `r` , `n` , `pmt` and `bgn`.

Author(s)

MaheshP Kumar, <maheshparamjitkumar@gmail.com> #' @references Hummelbrunner,S.A., Halliday,K., Hassanlou,A.R. (2020). *Contemporary Business Mathematics with Canadian Applications (12th Edition).* Pearson Education Canada. ISBN 9780135285015, `https://bookshelf.` `vitalsource.com/books/9780135406380`.

Examples

```
fvYearlyAnnuityCompQuarterly(0.11,4,-300,0)
fvYearlyAnnuityCompQuarterly(0.11,4,-300,1)
fvYearlyAnnuityCompQuarterly(0.11,4,300,0)
fvYearlyAnnuityCompQuarterly(0.11,4,300,1)
```

---

fvYearlyAnnuityCompSemiAnnually

Calculates Future Value of Yearly Paid Ordinary Annuity or Annuity Due that is Compounded Semi-Annually.

Description

Calculates Future Value of Yearly Paid Ordinary Annuity or Annuity Due that is Compounded Semi-Annually.

Usage

```
fvYearlyAnnuityCompSemiAnnually(r, n, pmt, bgn)
```

Arguments

r	A number.
n	A number.
pmt	A number.
bgn	A number.

Details

As Brooks,R. (2018) mentions that Future Value calculations value cash flow at a single point in time in the future. The method `fvYearlyAnnuityCompSemiAnnually()` is developed to calculate Future Value of Yearly-Paid Ordinary Annuity or Annuity Due that is Compounded Semi-Annually. The method gives Future Value when values are passed to its four arguments. Here `r` is annual rate, `n` is number of years, `pmt` is amount of one annuity and `bgn` is the computational mode. (Enter 1 when annuity payment occurs at the beginning of the period; 0 for end of period payments)

Value

Input values to four arguments `r` , `n` , `pmt` and `bgn`.

Author(s)

MaheshP Kumar, <maheshparamjitkumar@gmail.com>

References

Brooks,R. (2018). *Financial Management (4th Edition)*. Pearson Education (US). ISBN 9780134730417, https://bookshelf.vitalsource.com/books/9780134731070.

Examples

```
fvYearlyAnnuityCompSemiAnnually(0.11,4,-300,0)
fvYearlyAnnuityCompSemiAnnually(0.11,4,-300,1)
fvYearlyAnnuityCompSemiAnnually(0.11,4,300,0)
fvYearlyAnnuityCompSemiAnnually(0.11,4,300,1)
```

---

fvYearlyCompSingleCF	*Computing Future Value of a Single Cash Flow with Yearly Compounding Frequency.*

Description

Computing Future Value of a Single Cash Flow with Yearly Compounding Frequency.

Usage

```
fvYearlyCompSingleCF(r, n, pv)
```

Arguments

r	A number.
n	A number.
pv	A number.

Details

As Brooks,R. (2018) explains Future Value is the cash value of an money or an asset in the future that is equivalent in value to a specific amount today. This, acts as basis of understanding how interest accumulates (and gets compounded) and how the Time Value of Money equation can be used for estimating growth. On these lines, fvYearlyCompSingleCF() was developed and it calculates Future Value of a Single Cash Flow with Yearly Compounding Frequency. fvYearlyCompSingleCF() gives Future Value when values are passed to its three arguments. Here r is annual rate, n is number of years and pv is Present Value

Value

Input values to three arguments r , n and pv.

Author(s)

MaheshP Kumar, <maheshparamjitkumar@gmail.com>

References

Brooks,R. (2018). *Financial Management (4th Edition)*. Pearson Education (US). ISBN 9780134730417, https://bookshelf.vitalsource.com/books/9780134731070.

Examples

```
fvYearlyCompSingleCF(0.08,10,2000)
fvYearlyCompSingleCF(0.08,10,-2000)
```

---

pvAnytypePerpetuity   *Computing Present Value of an Ordinary Perpetuity or Perpetuity Due.*

Description

Computing Present Value of an Ordinary Perpetuity or Perpetuity Due.

Usage

```
pvAnytypePerpetuity(r, pmt, bgn)
```

Arguments

r	A number.
pmt	A number.
bgn	A number.

Details

According to Hummelbrunner,S.A. et al. (2020), a Perpetuity is an annuity for which the payments continue forever. When the size of the periodic payment from a fund is equal to the periodic interest earned by the fund, such as an endowment fund to a university or a continuous benefit from a capital investment, a Perpetuity gets resulted. The method pvAnytypePerpetuity() is developed to compute Present Value(PV) of an Ordinary Perpetuity or Perpetuity Due.The method gives Present Value when values are passed to its three arguments. Here r is annual rate, pmt is amount of one annuity and bgn is the computational mode. (Enter 1 when annuity payment occurs at the beginning of the period; 0 for end of period payments)

Value

Input values to three arguments r , pmt and bgn.

Author(s)

MaheshP Kumar, <maheshparamjitkumar@gmail.com>

References

Hummelbrunner,S.A., Halliday,K., Hassanlou,A.R. (2020). *Contemporary Business Mathematics with Canadian Applications (12th Edition)*. Pearson Education Canada. ISBN 9780135285015, https://bookshelf.vitalsource.com/books/9780135406380.

Examples

```
pvAnytypePerpetuity( 0.08, 4.5, 1)
pvAnytypePerpetuity( 0.08, 4.5, 0)
```

---

pvContinuousCompSingleCF

Calculates Present Value of a Single Cash Flow that is Compounded Continuously.

Description

Calculates Present Value of a Single Cash Flow that is Compounded Continuously.

Usage

```
pvContinuousCompSingleCF(r, n, fv)
```

Arguments

r	A number.
n	A number.
fv	A number.

Details

According to Titman,S. et al. (2017), a continuously compounding scenario is that where the time intervals between interest payments are infinitely small. The Method `pvContinuousCompSingleCF()` was developed for this scenario and calculates Present Value of a Single Cash Flow that is Compounded Continuously. The method gives Present Value when values are passed to its three arguments. Here `r` is annual rate, `n` is number of years and `fv` is Future Value

Value

Input values to three arguments `r`, `n` and `fv`.

Author(s)

MaheshP Kumar, <maheshparamjitkumar@gmail.com>

References

Hummelbrunner,S.A., Halliday,K., Hassanlou,A.R. (2020). *Contemporary Business Mathematics with Canadian Applications (12th Edition).* Pearson Education Canada. ISBN 9780135285015, https://bookshelf.vitalsource.com/books/9780135406380.

Examples

```
pvContinuousCompSingleCF(0.1854,1,3250)
pvContinuousCompSingleCF(0.1854,1,-3250)
```

---

pvDailyCompSingleCF	*Calculates Present Value of a Single Cash Flow for Daily Compounding Frequency.*

Description

Calculates Present Value of a Single Cash Flow for Daily Compounding Frequency.

Usage

```
pvDailyCompSingleCF(r, n, fv)
```

Arguments

r	A number.
n	A number.
fv	A number.

Details

As defined by Brooks,R. (2018), Present Value is the value today of tomorrow's cash flow. Computation of the equivalent value of a Future Value in today's dollars, is done by discounting the Future Value back to the Present Value at a given discount rate. The method pvDailyCompSingleCF() is developed to calculates Present Value of a Single Cash Flow for daily Compounding Frequency.The method gives Present Value when values are passed to its three arguments. Here r is annual rate, n is number of years and fv is Future Value

Value

Input values to three arguments r , n and fv.

Author(s)

MaheshP Kumar, <maheshparamjitkumar@gmail.com>

References

Brooks,R. (2018). *Financial Management (4th Edition)*. Pearson Education (US). ISBN 9780134730417, https://bookshelf.vitalsource.com/books/9780134731070.

Examples

```
pvDailyCompSingleCF(0.08,10,-2000)
pvDailyCompSingleCF(0.08,10,2000)
```

---

pvMonthlyCompSingleCF	*Computing Present Value of a Single Cash Flow under Monthly Compounding Frequency.*

Description

Computing Present Value of a Single Cash Flow under Monthly Compounding Frequency.

Usage

```
pvMonthlyCompSingleCF(r, n, fv)
```

Arguments

r	A number.
n	A number.
fv	A number.

Details

The method `pvMonthlyCompSingleCF()` is developed to compute Present Value of a Single Cash Flow under Monthly Compounding Frequency.The method gives Present Value when values are passed to its three arguments. Here r is annual rate, n is number of years and fv is Future Value.

Value

Input values to three arguments r , n and fv.

Author(s)

MaheshP Kumar, <maheshparamjitkumar@gmail.com>

References

Hummelbrunner,S.A., Halliday,K., Hassanlou,A.R. (2020). *Contemporary Business Mathematics with Canadian Applications (12th Edition)*. Pearson Education Canada. ISBN 9780135285015, https://bookshelf.vitalsource.com/books/9780135406380.

Examples

```
pvMonthlyCompSingleCF(0.08,10,2000)
pvMonthlyCompSingleCF(0.08,10,-2000)
```

---

pvMonthlyPaidAnnuityCompMonthly

Computing Present Value of Monthly paid Ordinary Annuity or Annuity Due for Monthly Compounding.

Description

Computing Present Value of Monthly paid Ordinary Annuity or Annuity Due for Monthly Compounding.

Usage

```
pvMonthlyPaidAnnuityCompMonthly(r, n, pmt, bgn)
```

Arguments

r	A number.
n	A number.
pmt	A number.
bgn	A number.

Details

According to Brooks,R. (2018), not all Annuities are Ordinary (end-of-period) Annuities. Some payments are due at the beginning of the time-period. For example, when paying rent on an apartment, the person applies the rent at the first or beginning of the month, which is more like a prepayment. The rental payment is an Annuity Due, whereas the car payment and mortgage payment are Ordinary Annuities. To make this distinction between the beginning of the month and the end of the month clearer, consider that making a rent payment allows you to use the apartment for the remainder of the month; that is, you are paying at the beginning of the period for the use of the apartment for that period. You are thus paying in advance. With a mortgage payment, you are paying down the principal and paying interest on the loan for the prior month. So, in that case, the mortgage payment applies to the previous month or a payment at the end of the month. You are thus paying in arrears. When dealing with such situation, you can use the method pvMonthlyPaidAnnuityCompMonthly() that gives Present Value when values are passed to its four arguments. Here r is annual rate, n is number of years, pmt is amount of one annuity and bgn is the computational mode. (Enter 1, when annuity payment occurs at the beginning of the period; 0 for end of period payments)

Value

Input values to four arguments r , n , pmt and bgn.

Author(s)

MaheshP Kumar, <maheshparamjitkumar@gmail.com>

References

Brooks,R. (2018). *Financial Management (4th Edition)*. Pearson Education (US). ISBN 9780134730417, https://bookshelf.vitalsource.com/books/9780134731070.

Examples

```
pvMonthlyPaidAnnuityCompMonthly(0.06,12, -200, 1)
pvMonthlyPaidAnnuityCompMonthly(0.06,12, -200, 0)
pvMonthlyPaidAnnuityCompMonthly(0.06,12, 200, 1)
pvMonthlyPaidAnnuityCompMonthly(0.06,12, 200, 0)
```

---

pvQuarterlyCompSingleCF

Computing Present Value of a Single Cash Flow for Quarterly Compounding.

Description

Computing Present Value of a Single Cash Flow for Quarterly Compounding.

Usage

```
pvQuarterlyCompSingleCF(r, n, fv)
```

Arguments

r	A number.
n	A number.
fv	A number.

Details

As explained by Hummelbrunner,S.A. et al. (2020), in simple interest calculations, the stated rate of interest, r, is usually expressed as an annual rate and that is also called the nominal rate of interest. In Compound Interest calculations, the periodic rate of interest is determined by dividing the nominal annual rate of interest by the compounding periods per year.The compounding periods commonly used in business and finance cover a number of months, or a number of days, quarters, or semi-annual periods or annual periods. Mortgages and car loans include weekly and bi-weekly payment options. In this light, the method pvQuarterlyCompSingleCF() was developed for Quarterly compounding scenario and it gives Present Value when values are passed to its three arguments. Here r is annual rate, n is number of years and fv is Future Value

Value

Input values to three arguments `r` , `n` and `fv`.

Author(s)

MaheshP Kumar, `<maheshparamjitkumar@gmail.com>`

References

Hummelbrunner,S.A., Halliday,K., Hassanlou,A.R. (2020). *Contemporary Business Mathematics with Canadian Applications (12th Edition).* Pearson Education Canada. ISBN 9780135285015, https://bookshelf.vitalsource.com/books/9780135406380.

Examples

```
pvQuarterlyCompSingleCF(0.08,10,2000)
pvQuarterlyCompSingleCF(0.08,10,-2000)
```

---

pvQuarterlyPaidAnnuityCompQuarterly

Computing Present Value of Quarterly Paid Ordinary Annuity or Annuity Due that is Compounded Quarterly.

Description

Computing Present Value of Quarterly Paid Ordinary Annuity or Annuity Due that is Compounded Quarterly.

Usage

```
pvQuarterlyPaidAnnuityCompQuarterly(r, n, pmt, bgn)
```

Arguments

r	A number.
n	A number.
pmt	A number.
bgn	A number.

Details

As explained by Brooks,R. (2018), the way it is possible to find the Present Value of a single cash flow , on the same lines the Present Value of an annuity stream can also be computed. The method `pvQuarterlyPaidAnnuityCompQuarterly()` is developed to compute Present Value of Quarterly-Paid Ordinary Annuity or Annuity Due that is Compounded Quarterly.The method gives Present Value when values are passed to its four arguments. Here `r` is annual rate, `n` is number of years, `pmt` is amount of one annuity and `bgn` is the computational mode (Enter 1 when annuity payment occurs at the beginning of the period; 0 for end of period payments)

Value

Input values to four arguments r , n , pmt and bgn.

Author(s)

MaheshP Kumar, <maheshparamjitkumar@gmail.com>

References

Brooks,R. (2018). *Financial Management (4th Edition).* Pearson Education (US). ISBN 9780134730417, https://bookshelf.vitalsource.com/books/9780134731070.

Examples

```
pvQuarterlyPaidAnnuityCompQuarterly(0.06,12, -200, 1)
pvQuarterlyPaidAnnuityCompQuarterly(0.06,12, -200, 0)
pvQuarterlyPaidAnnuityCompQuarterly(0.06,12, 200, 1)
pvQuarterlyPaidAnnuityCompQuarterly(0.06,12, 200, 0)
```

---

pvSemiAnnualCompSingleCF

Computing Present Value of a Single Cash Flow for Semi-Annual Compounding.

Description

Computing Present Value of a Single Cash Flow for Semi-Annual Compounding.

Usage

```
pvSemiAnnualCompSingleCF(r, n, fv)
```

Arguments

r	A number.
n	A number.
fv	A number.

Details

The method pvSemiAnnualCompSingleCF() is developed to compute Present Value of a Single Cash Flow for Semi-Annual Compounding Frequency and gives Present Value when values are passed to its three arguments. Here r is annual rate, n is number of years and fv is Future Value.

Value

Input values to three arguments r , n and fv.

Author(s)

MaheshP Kumar, <maheshparamjitkumar@gmail.com>

References

Hummelbrunner,S.A., Halliday,K., Hassanlou,A.R. (2020). *Contemporary Business Mathematics with Canadian Applications (12th Edition)*. Pearson Education Canada. ISBN 9780135285015, https://bookshelf.vitalsource.com/books/9780135406380.

Examples

```
pvSemiAnnualCompSingleCF(0.08,10,2000)
pvSemiAnnualCompSingleCF(0.08,10,-2000)
```

---

pvSemiAnnuallyPaidAnnuityCompSemiAnnually

Computing Present Value of Semi-Annually Paid Ordinary Annuity or Annuity Due that is Compounded Semi-Annually.

Description

Computing Present Value of Semi-Annually Paid Ordinary Annuity or Annuity Due that is Compounded Semi-Annually.

Usage

```
pvSemiAnnuallyPaidAnnuityCompSemiAnnually(r, n, pmt, bgn)
```

Arguments

r	A number.
n	A number.
pmt	A number.
bgn	A number.

Details

The method pvSemiAnnuallyPaidAnnuityCompSemiAnnually() is developed to compute Present Value of Semi-Annually Paid Ordinary Annuity or Annuity Due that is Compounded Semi-Annually and gives Present Value when values are passed to its four arguments. Here r is annual rate, n is number of years, pmt is amount of one annuity and bgn is the computational mode. (Enter 1 when annuity payment occurs at the beginning of the period; 0 for end of period payments)

Value

Input values to four arguments r , n , pmt and bgn

Author(s)

MaheshP Kumar, <maheshparamjitkumar@gmail.com>

References

Hummelbrunner,S.A., Halliday,K., Hassanlou,A.R. (2020). *Contemporary Business Mathematics with Canadian Applications (12th Edition)*. Pearson Education Canada. ISBN 9780135285015, <https://bookshelf.vitalsource.com/books/9780135406380>.

Examples

```
pvSemiAnnuallyPaidAnnuityCompSemiAnnually(0.06,12, -200, 1)
pvSemiAnnuallyPaidAnnuityCompSemiAnnually(0.06,12, -200, 0)
pvSemiAnnuallyPaidAnnuityCompSemiAnnually(0.06,12, 200, 1)
pvSemiAnnuallyPaidAnnuityCompSemiAnnually(0.06,12, 200, 0)
```

---

pvVariousCompSingleCF	*Calculates Present Value of Single Cash Flow for various Compounding Frequencies.*

Description

Calculates Present Value of Single Cash Flow for various Compounding Frequencies.

Usage

```
pvVariousCompSingleCF(r, n, fv, cfreq)
```

Arguments

r	A number.
n	A number.
fv	A number.
cfreq	A number.

Details

The method `pvVariousCompSingleCF()` is developed to calculate Present Value of Single Cash Flow for various Compounding Frequencies and gives Present Value when values are passed to its four arguments. Here r is annual rate, n is number of years, pv is Present Value and cfreq is Compounding Frequency value that must be either 1 or 2 or 4 or 12 or 365.

Value

Input values to four arguments r , n , fv and cfreq

Author(s)

MaheshP Kumar, <maheshparamjitkumar@gmail.com>

References

Hummelbrunner,S.A., Halliday,K., Hassanlou,A.R. (2020). *Contemporary Business Mathematics with Canadian Applications (12th Edition)*. Pearson Education Canada. ISBN 9780135285015, https://bookshelf.vitalsource.com/books/9780135406380.

Examples

```
pvVariousCompSingleCF( 0.08,10,2000,2)
pvVariousCompSingleCF( 0.08,10,2000,4)
pvVariousCompSingleCF( 0.08,10,2000,12)
pvVariousCompSingleCF( 0.08,10,2000,365)
```

---

pvYearlyAnnuityCompDaily

Computing Present Value of Yearly Paid Ordinary Annuity or Annuity Due that is Compounded Daily.

Description

Computing Present Value of Yearly Paid Ordinary Annuity or Annuity Due that is Compounded Daily.

Usage

```
pvYearlyAnnuityCompDaily(r, n, pmt, bgn)
```

Arguments

r	A number.
n	A number.
pmt	A number.
bgn	A number.

Details

As described by Titman,S. et al. (2017), Time Value of Money calculations are essentially comparisons between Present Value, that is what a cash flow is worth today, and Future Value, that is what a cash flow will be worth in the future. The Future Value is impacted by the frequency of compounding. In most of the Time Value of Money situations the compounding period is an Year in length. However, this is not always true. For instance, banks often offer saving accounts that compound the interest every day, month, or quarter. Depositor, in this scenario, should prefer more frequent compounding because more interest is earned when interest is compounded more frequently. Most common compounding situations include daily, monthly, quarterly and yearly compounding. The

method `pvYearlyAnnuityCompDaily()` is developed to compute Present Value of Yearly-Paid Ordinary Annuity or Annuity Due that is compounded daily. The method gives PResent Value when values are passed to its four arguments. Here `r` is annual rate, `n` is number of years,`pmt` is amount of one annuity and `bgn` is the computational mode. (Enter 1 when annuity payment occurs at the beginning of the period; 0 for end of period payments).

Value

Input values to four arguments `r` , `n` , `pmt` and `bgn`

Author(s)

MaheshP Kumar, <maheshparamjitkumar@gmail.com>

References

Titman,S., Keown,A.J., Martin,J.D. (2017). *Financial Management: Principles and Applications(13th Edition)*. Pearson Education (US). ISBN 9780134417219, https://bookshelf.vitalsource.com/books/9780134418001.

Examples

```
pvYearlyAnnuityCompDaily(0.11,4,-300,0)
pvYearlyAnnuityCompDaily(0.11,4,-300,1)
pvYearlyAnnuityCompDaily(0.11,4,300,0)
pvYearlyAnnuityCompDaily(0.11,4,300,1)
```

---

pvYearlyAnnuityCompMonthly

Computing Present Value of Yearly Paid Ordinary Annuity or Annuity Due that is Compounded Monthly.

Description

Computing Present Value of Yearly Paid Ordinary Annuity or Annuity Due that is Compounded Monthly.

Usage

```
pvYearlyAnnuityCompMonthly(r, n, pmt, bgn)
```

Arguments

r	A number.
n	A number.
pmt	A number.
bgn	A number.

Details

As explained by Hummelbrunner,S.A. et al. (2020), the description of the Compounding Frequency
is usually contained within the phrase that describes the nominal interest rate. An example would
be 24 percent compounded monthly. This means that the nominal, or annual, interest rate of 24
percent is compounded 12 times each year at 24/12 that is 2 percent, each period. The method
`pvYearlyAnnuityCompMonthly()` is developed to compute Present Value of Yearly-Paid Ordinary
Annuity or Annuity Due that is Compounded Monthly.The method gives Present Value when values
are passed to its four arguments. Here `r` is annual rate,n is number of years,`pmt` is amount of one
annuity and `bgn` is the computational mode. (Enter 1 when annuity payment occurs at the beginning
of the period; 0 for end of period payments).

Value

Input values to four arguments `r` , `n` , `pmt` and `bgn`

Author(s)

MaheshP Kumar, <maheshparamjitkumar@gmail.com>

References

Hummelbrunner,S.A., Halliday,K., Hassanlou,A.R. (2020). *Contemporary Business Mathematics
with Canadian Applications (12th Edition).* Pearson Education Canada. ISBN 9780135285015,
<https://bookshelf.vitalsource.com/books/9780135406380>.

Examples

```
pvYearlyAnnuityCompMonthly(0.11,4,-300,0)
pvYearlyAnnuityCompMonthly(0.11,4,-300,1)
pvYearlyAnnuityCompMonthly(0.11,4,300,0)
pvYearlyAnnuityCompMonthly(0.11,4,300,1)
```

---

pvYearlyAnnuityCompQuarterly

*Computing Present Value of Yearly Paid Ordinary Annuity or Annuity
Due that is Compounded Quarterly.*

Description

Computing Present Value of Yearly Paid Ordinary Annuity or Annuity Due that is Compounded
Quarterly.

Usage

```
pvYearlyAnnuityCompQuarterly(r, n, pmt, bgn)
```

Arguments

r	A number.
n	A number.
pmt	A number.
bgn	A number.

Details

As explained by Hummelbrunner,S.A. et al. (2020), the description of the compounding frequency is usually contained within the phrase that describes the nominal interest rate. An example would be 8 percent compounded quarterly This means that the nominal, or annual, interest rate of 8 percent is compounded four times each year at 8/4 that is 2 percent, each period. So the method `pvYearlyAnnuityCompQuarterly()` is developed to Compute Present Value(PV) of Yearly Paid Ordinary Annuity or Annuity Due that is compounded Quarterly.The method gives PV when values are passed to its four arguments. Here `r` is annual rate, `n` is number of years,`pmt` is amount of one annuity and `bgn` is the computational mode. (Enter 1 when annuity payment occurs at the beginning of the period; 0 for end of period payments).

Value

Input values to four arguments `r` , `n` , `pmt` and `bgn`

Author(s)

MaheshP. Kumar, <maheshparamjitkumar@gmail.com>

References

Hummelbrunner,S.A., Halliday,K., Hassanlou,A.R. (2020). *Contemporary Business Mathematics with Canadian Applications (12th Edition).* Pearson Education Canada. ISBN 9780135285015, https://bookshelf.vitalsource.com/books/9780135406380.

Examples

```
pvYearlyAnnuityCompQuarterly(0.11,4,-300,0)
pvYearlyAnnuityCompQuarterly(0.11,4,-300,1)
pvYearlyAnnuityCompQuarterly(0.11,4,300,0)
pvYearlyAnnuityCompQuarterly(0.11,4,300,1)
```

---

pvYearlyAnnuityCompSemiAnnually

Computing Present Value of Yearly Paid Ordinary Annuity or Annuity Due that is Compounded Semi-Annually.

Description

Computing Present Value of Yearly Paid Ordinary Annuity or Annuity Due that is Compounded Semi-Annually.

Usage

```
pvYearlyAnnuityCompSemiAnnually(r, n, pmt, bgn)
```

Arguments

r	A number.
n	A number.
pmt	A number.
bgn	A number.

Details

As Hummelbrunner,S.A. et al. (2020) explains, while dealing with annuity scenarios, first we must identify whether the problem is that of an Ordinary Annuity or Annuity Due. In an Ordinary Annuity the payment is made at the end of the payment period, whereas, in Annuity Due payment is made in the beginning of the year. To incorporate this effect, the method pvYearlyAnnuityCompSemiAnnually() is developed to compute Present Value of Yearly Paid Ordinary Annuity or Annuity Due that is compounded Semi-Annually. This method gives Present Value when values are passed to its four arguments. Here r is annual rate, n is number of years,pmt is amount of one annuity and bgn is the mode. (Enter 1 when annuity payment occurs at the beginning of the period; 0 for end of period payments).

Value

Input values to four arguments r , n , pmt and bgn

Author(s)

MaheshP Kumar, <maheshparamjitkumar@gmail.com>

References

Hummelbrunner,S.A., Halliday,K., Hassanlou,A.R. (2020). *Contemporary Business Mathematics with Canadian Applications (12th Edition)*. Pearson Education Canada. ISBN 9780135285015, https://bookshelf.vitalsource.com/books/9780135406380.

Examples

```
pvYearlyAnnuityCompSemiAnnually(0.11,4,-300,0)
pvYearlyAnnuityCompSemiAnnually(0.11,4,-300,1)
pvYearlyAnnuityCompSemiAnnually(0.11,4,300,0)
pvYearlyAnnuityCompSemiAnnually(0.11,4,300,1)
```

pvYearlyCompSingleCF	*Computing Present Value of a Single Cash Flow with Yearly Compounding.*

Description

Computing Present Value of a Single Cash Flow with Yearly Compounding.

Usage

```
pvYearlyCompSingleCF(r, n, fv)
```

Arguments

r	A number.
n	A number.
fv	A number.

Details

As Brooks,R. (2018) points out that when we are interested in computing the current value of something that we will receive in the future for that the concept called Present Value is used. He further comments that Present Value is a bit trickier to understand, but it helps us put a price or value today on a future cash flow. To get quantitative estimate of the Present Value, you can use the method pvYearlyCompSingleCF() that computes for you Present Value of a Single Cash Flow with Yearly Compounding Frequency. The method pvYearlyCompSingleCF() gives Present Value when values are passed to its three arguments. Here r is annual rate, n is number of years and fv is Future Value.

Value

Input values to three arguments r , n and fv.

Author(s)

MaheshP Kumar, <maheshparamjitkumar@gmail.com>

References

Brooks,R. (2018). *Financial Management (4th Edition)*. Pearson Education (US). ISBN 9780134730417, https://bookshelf.vitalsource.com/books/9780134731070.

Examples

```
pvYearlyCompSingleCF(0.08,10,2000)
pvYearlyCompSingleCF(0.08,10,-2000)
```

---

pvYearlyPaidAnnuityCompYearly

> *Computing Present Value of Yearly Paid Ordinary Annuity or Annuity Due that is Compounded Annually.*

Description

Computing Present Value of Yearly Paid Ordinary Annuity or Annuity Due that is Compounded Annually.

Usage

```
pvYearlyPaidAnnuityCompYearly(r, n, pmt, bgn)
```

Arguments

r	A number.
n	A number.
pmt	A number.
bgn	A number.

Details

Classification of annuities is done by Hummelbrunner,S.A. et al. (2020), using the date of payment. In an Ordinary Annuity, payments are made at the end of each payment period. In an Annuity Due, payments are made at the beginning of each payment period. Loan payments, mortgage payments, and interest payments on bonds are all examples of Ordinary Annuities. The method pvYearlyPaidAnnuityCompYearly()is developed to compute Present Value(pv) of Yearly-Paid Ordinary Annuity or Annuity Due that is compounded Annually and gives PResent Value when values are passed to its four arguments. Here r is annual rate, n is number of years, pmt is amount of one annuity and bgn is the computational mode. (Enter 1 when annuity payment occurs at the beginning of the period; 0 for end of period payments).

Value

Input values to four arguments r , n , pmt and bgn

Author(s)

MaheshP Kumar, <maheshparamjitkumar@gmail.com>

References

Hummelbrunner,S.A., Halliday,K., Hassanlou,A.R. (2020). *Contemporary Business Mathematics with Canadian Applications (12th Edition)*. Pearson Education Canada. ISBN 9780135285015, https://bookshelf.vitalsource.com/books/9780135406380.

Examples

```
pvYearlyPaidAnnuityCompYearly(0.06,12, -200, 1)
pvYearlyPaidAnnuityCompYearly(0.06,12, -200, 0)
pvYearlyPaidAnnuityCompYearly(0.06,12, 200, 1)
pvYearlyPaidAnnuityCompYearly(0.06,12, 200, 0)
```

---

rorPerpetuity	*Computing Rate of Return of a Perpetuity.*

Description

Computing Rate of Return of a Perpetuity.

Usage

```
rorPerpetuity(yearendCF, deposit)
```

Arguments

yearendCF	A number.
deposit	A number.

Details

As defined by Hummelbrunner,S.A. et al. (2020), a Perpetuity is an annuity in which the periodic payments begin on a fixed date and continue indefinitely. Interest payments on permanently invested sums of money are prime examples of Perpetuity. Dividends on preferred shares fall into this category if the issuing corporation has an indefinite life. Scholarships and trust funds paid perpetually from an endowment also fit the definition of Perpetuity. The method rorPerpetuity() is developed to compute Rate of Return(r) of a Perpetuity and gives r when values are passed to its two arguments. Here yearendCF is Cash Flow occurring at the Year-End and deposit stands for amount of the Deposit

Value

Input values to two arguments yearendCF and deposit

Author(s)

MaheshP Kumar, <maheshparamjitkumar@gmail.com>

References

Hummelbrunner,S.A., Halliday,K., Hassanlou,A.R. (2020). *Contemporary Business Mathematics with Canadian Applications (12th Edition)*. Pearson Education Canada. ISBN 9780135285015, https://bookshelf.vitalsource.com/books/9780135406380.

Examples

```
rorPerpetuity(15, 180)
rorPerpetuity(10, 120)
```

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