How can I calculate compound interest in Python?

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Compound interest refers to the interest earned not only on the initial amount but also on the accumulated interest of previous periods. In Python, compound interest can be calculated by using the formula A = P(1+r/n)^(nt), where A is the final amount, P is the principal amount, r is the annual interest rate, n is the number of times the interest is compounded per year, and t is the number of years. This formula can be easily implemented in Python by using the appropriate mathematical operators and functions. By inputting the necessary values, the code can accurately calculate the compound interest for any given period, making it a useful tool for financial calculations and investments.

Calculate Compound Interest in Python (3 Examples)

We can use the following compound interest formula to find the ending value of some investment after a certain amount of time:

A = P(1 + r/n)nt

where:

A: Final AmountP: Initial Principalr: Annual Interest Raten: Number of compounding periods per yeart: Number of years

We can use the following formula to calculate the ending value of some investment in Python:

P*(pow((1+r/n), n*t))

And we can use the following function to display the

ending value of some investment at the end of each period:

```
def each_year(P, r, n, t):

for period in range(t):
amount = P*(pow((1+r/n), n*(period+1)))
print('Period:', period+1, amount)

return amount
```

The following examples show how to use these formulas in Python to calculate the ending value of investments in different scenarios.

Example 1: Compound Interest Formula with Annual Compounding

Suppose we invest $5,000 into an investment that compounds at 6% annually.

The following code shows how to calculate the ending value of this investment after 10 years:

```
#define principal, interest rate, compounding periods per year, and total years
P = 5000
```

r = .06

n = 1

t = 10

#calculate final amount

P*(pow((1+r/n), n*t))

8954.238482714272

This investment will be worth $8,954.24 after 10 years.

We can use the function we defined earlier to display the ending investment after each year during the 10-year period:

#display ending investment after each year during 10-year period

each_year(P, r, n, t)

Period: 1 5300.0

Period: 2 5618.000000000001

Period: 3 5955.08

Period: 4 6312.384800000002

Period: 5 6691.127888000002

Period: 6 7092.595561280002

Period: 7 7518.151294956803

Period: 8 7969.240372654212

Period: 9 8447.394795013464

Period: 10 8954.238482714272

This tells us:

The ending value after year 1 was $5,300.The ending value after year 2 was $5,618.The ending value after year 3 was $5,955.08.

And so on.

Example 2: Compound Interest Formula with Monthly Compounding

Suppose we invest $1,000 into an investment that compounds at 6% annually and is compounded on a monthly basis (12 times per year).

The following code shows how to calculate the ending value of this investment after 5 years:

```
#define principal, interest rate, compounding periods per year, and total years
P = 1000
r = .06
```

n = 12

t = 5

#calculate final amount

P*(pow((1+r/n), n*t))

1348.8501525493075

This investment will be worth $1,348.85 after 5 years.

Example 3: Compound Interest Formula with Daily Compounding

Suppose we invest $5,000 into an investment that compounds at 8% annually and is compounded on a daily basis (365 times per year).

The following code shows how to calculate the ending value of this investment after 15 years:

#define principal, interest rate, compounding periods per year, and total years

P = 5000

r = .08

n = 365

t = 15

#calculate final amount
P*(pow((1+r/n), n*t))

16598.40198554521

This investment will be worth $16,598.40 after 15 years.

The following tutorials explain how to perform other common tasks in Python: