

# DISCOUNT FINANCIAL OPERATIONS

**Simple Discount**  
**Compound Discount**

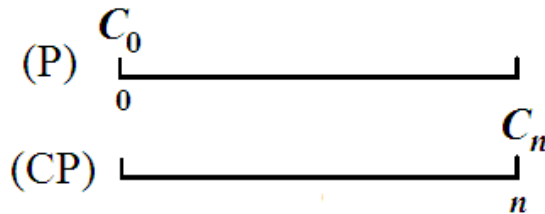
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# DISCOUNT FINANCIAL OPERATIONS



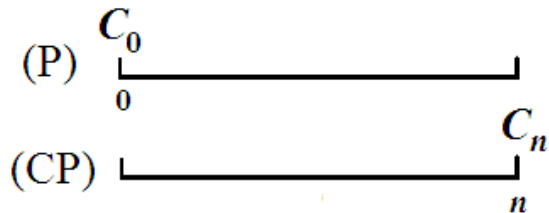
***The objective is to anticipate the availability of a future sum of money , by means of the application a financial mechanism called discounting.***

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# DISCOUNT FINANCIAL OPERATIONS



$C_n$  = future value of  $C_0$ , or the accumulated value of  $C_0$ , or the maturity value of  $C_0$

$C_0$  = the principal, or the present value of  $C_n$ , or the discounted value of  $C_n$

$n$  = time

$C_0 = f(C_n, n)$  *Relationship between  $C_0$  and  $C_n$  by means of a mathematical function*

$D_{0,n} = C_n - C_0$  discounted amount of money (in monetary terms)

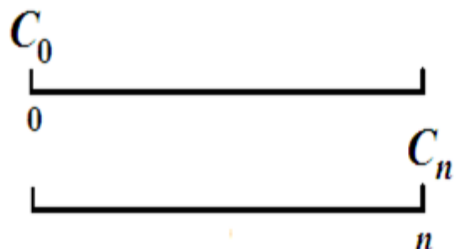
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# Simple discount at a simple discount rate



The discounted amount is proportional to  $C_n$  and  $n$

$$D_{0,n} = C_n - C_0 = d \cdot C_n \cdot n$$

$$C_0 = C_n - C_n \cdot d \cdot n$$

$$C_0 = C_n (1 - d \cdot n)$$



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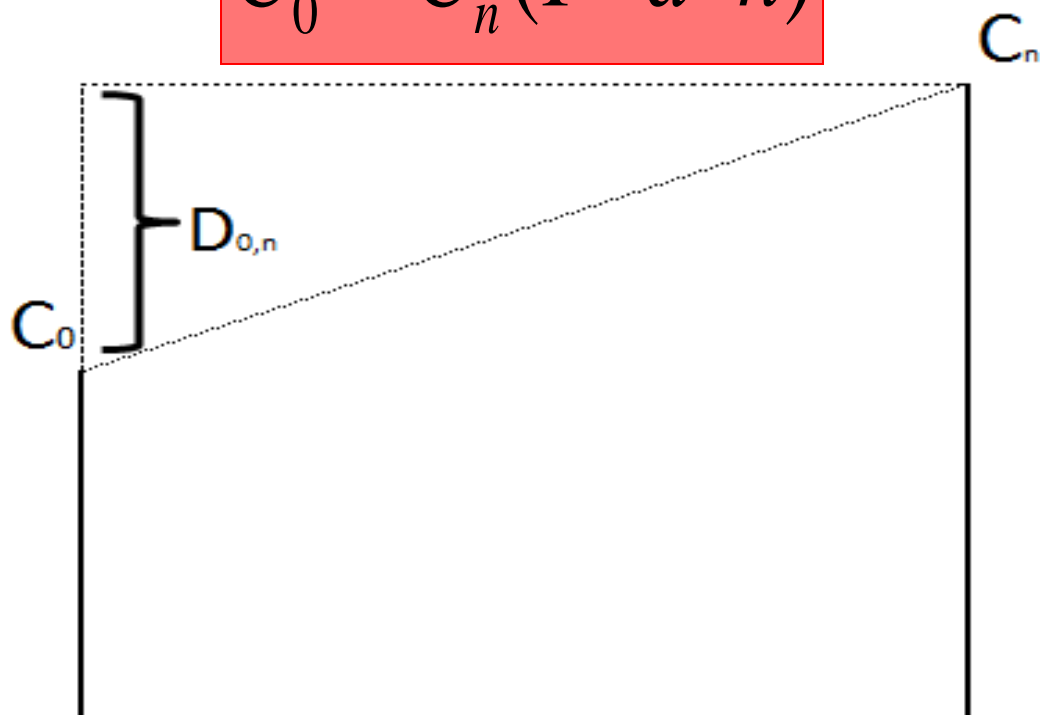
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# Simple discount at a discount rate

$$C_0 = C_n (1 - d \cdot n)$$



$d$

Simple discount  
rate

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# Simple discount at a discount rate

$d$  is simple discount rate and represents the cost of anticipating each monetary unit from the nominal

$$C_0 = C_n (1 - d \cdot n) \Rightarrow d = \frac{C_n - C_0}{C_n \cdot n}$$

$d$  is the discounted amount for each monetary unit during a period of time

**Note:** a temporary correspondence must exist between  $n$  and  $d$ , as both must be expressed using the same units (time)

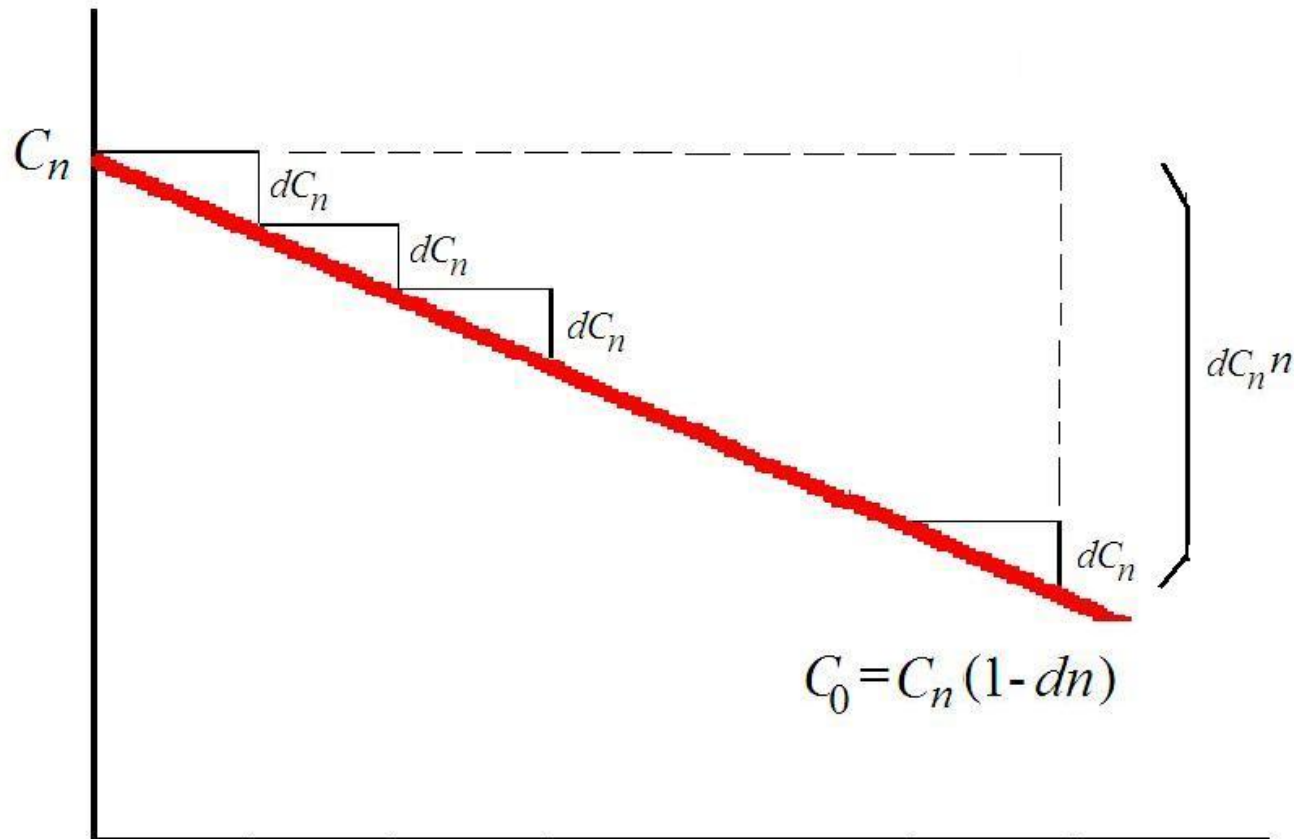
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# Simple discount at a discount rate



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# Simple equivalent discount rates

## Equivalent discount rates

***Two types of discount rates are said to be equivalent or indifferent using whichever chosen : they will produce the same discounted value of the same future value for the same period of time***

## Simple equivalent discount rates

***In simple discount the equivalent interest rates are proportional***

$$d = d \cdot m \Rightarrow d = \frac{d}{m}$$

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FINANCIAL MATHS



# Simple discount at a discount rate

- **Commercial year (ordinary interest)**
- The year is taken as 360 days
- The fraction of the year is expressed by

$$n = k / 360$$

$$C_0 = C_n \left( 1 - d \cdot \frac{k}{360} \right)$$

- **Civil year (exact interest)**
- The year is taken as 365 days (leap year or not)
- The fraction of the year is expressed by

$$n = k / 365$$

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# Examples

1. Determine the simple discount, at 8% (annual discount rate) of a simple loan with the following characteristics: principal: 450.000€; maturity within 2 years.
2. Mary has a promissory note with a maturity of 3 years. Taking into account that, the discounted amount of money at an annual discount rate was 353.40€ at 7% simple annual discount rate. What was its face value?
3. 122.215,81 € is the discounted value of a 120-day note at a simple annual discount rate of 9,5% . What was the face value? (ordinary interest)
4. A 80,000€ loan has been reduced in 1,200€ when it was discounted at 9% annual discount rate. How many months in advance was this loan paid off ?
5. A 175,000€ loan has been reduced to 173,359,37 by means of paying it off 45 days in advance. What was the discount rate applied? (ordinary interest)

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# EXAMPLES

6. A debtor reduced his debt to 271,269 €, by means of discounting a loan at annual discount rate of 9% two months before maturity. What was the future value?
7. Susan has a note with a face value of 9,785.74€ and the note is due in 3 months time. Supposing that a quarterly discount rate of 2% is applied. What will be the principal? (ordinary interest)
8. John has a note for 8,000 € and this note is due in 2 months. John has two options to discount the note:
  - a. Discounting immediately the note at a Bank A, charging an annual discount rate of 10% plus a commission of 2% over the future Value. (Simple Discount)
  - b. Bank B charges an annual discount rate of 9 % (Compound Discount ) and a

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