Finding the Rate

An ***interest rate*** is obtained by dividing the interest by the product of the principal and the time.

$$i = \frac{I}{Pn} = \frac{\text{Interest}}{\text{Principal x Time}}$$

Example 1

At what interest rate will €450 yield €236.25 in five years?

Example 2

A payment of €1,567.50 was made for discharging a four-month loan of €1,500. What was the interest rate charged?

Example 3

A man who borrowed €1,350 paid €1,363.50 as the total amount at the end of 30 days. What was the interest rate he paid?

Finding the Time

The ***time (n)*** of a loan is obtained by dividing the interest by the product of the principal and the interest rate.

$$n = \frac{I}{Pi} = \frac{\text{Interest}}{\text{Principal x Rate}}$$

Example 1

How long will it take €1,000 to yield €100 interest at 8%?

Example 2

A man paid a debt with a €280 cheque, which included €30 interest. Find the principal.

Example 3

How much money must Jones invest today at 12% simple interest if he is to receive €1,416, the amount, in one and a half years?

Finding the Principal

Two ways to calculate the Principal

By the formula $I=Pin$ i.e. $P = \frac{I}{in}$

By the formula $S=P+I=P(1+in)$ i.e. $P = \frac{S}{1+in} = \frac{S}{\text{Amount of 1}}$

Example 1

A woman receives €300 interest in three months from an investment that pays 12% interest. What is the principal that she has invested?

Present Value

Present value is the value at the time of investment, such as the principal, or at any time before the maturity date (date due).

Simple Discount

The process of finding the present calue of a given amount that is due on a future date and includes a simple interest is called ***discounting at simple interest,*** or commonly, the ***simple discount method.***

In other words, to discount an amount by the simple interest process is to find its present value.

When interest is involves, the amount must be larger than its present value. The difference between the amount and its present value is called the ***simple discount.***

Discounting on a non-interest-bearing debt

Example 1

What is the present value of €3,248 that is due at the end of two months if the interest rate is 9%? What is the simple discount?

Example 2

Discount €3,248 for two months at the simple interest rate 9%. What is the present value and the simple discount?

Example 3

A debt of €870.50 is due in six months. If the debt is settled now and the simple interest rate of 6% is allowed, what is the present value and the simple discount?

Discounting an interest-bearing debt

To find the present value of an interest-bearing debt (or to discount the amount by the simple discount method), take the following steps:

Step 1:

Find the maturity value (the amount) according the original interest rate and the time stipulated for the debt. Use the formula $S=P(1+in)$, where S is the amturity value and P is the original debt.

Step 2:

Find the present value (the value on the date of discount) of the maturity value according to the interest rate for discounting and the discount period. The discount period is the period from the date of discount to the maturity date. Use the formula in the form $P=\frac{S}{1+in}$, where P is the present value and S is the maturity value. However, the values of i and n in this step are often different from the values in i and n in step 1.

Example 1

A man borrowed €1,000 on May 1, 1999 and agreed to repay the money plus 8% interest in six months. Two months after the money was borrowed, the creditor agreed to settle the debt by discounting it at the simple interest rate of 9%. How much did the creditor receive when he discounted the debt?

Example 2

In the last example, assume that the simple interest rate for discounting is also 8%. How much would the creditor receive when discounting the debt?