Compound Interest

$P_n=P_0(1+r/k)^{Nk}$

P_N is the _____.
P_0 is the starting balance of the account
(also called initial deposit, or _____)

r is the _____ in decimal form
k is the _____in one year

If the compounding is done annually (once a year), k = 1.
If the compounding is done quarterly, k = 4.
If the compounding is done monthly, k = 12.
If the compounding is done daily, k = 365.

Example

A new savings bond offers a fixed interest rate and compounds quarterly, providing an attractive option for long-term investments. Suppose you invest $5,000 in a savings bond with an annual interest rate of 4%, compounded quarterly. How much will your investment be worth after 15 years?

$P_n=P_0(1+r/k)^{Nk}$

P_0 =_____ (initial deposit)
r = _____ (4% annual rate)}
k= ____ (4 quarters in a year)
N=____ (15 years)
The future value formula is:
$P_N=P_0(1+k/r)^{N\cdot k}$
Substituting the values: P__ = _____(1+ __/____)^__= $9024.80

Question

An investment account offers an annual interest rate of 5%, compounded semiannually, to encourage long-term savings. Suppose you deposit $7,500 into the account. How much will the account balance be after 10 years?

Question

A retirement fund offers an annual interest rate of 4.5%, compounded annually, to help investors grow their savings. Suppose you contribute $10,000 to this fund. How much will the account be worth after 12 years?

Example

You know that you will need $25,000 for a down payment on a house in 15 years. If your account earns 3.5% interest compounded monthly, how much would you need to deposit now to reach your goal?

$P_n = P_0(1+r/k)^{Nk}$

$$P_0 = \frac{P_N}{(1+r/k)^{N \cdot k}}$$

$$P_0 = \frac{\_\_\_\_\_}{(1+\_\_\_\_\_/\_\_\_)^{\_\cdot\_}} = \$15{,}161.35$$

Question

You want to save $30,000 for a car purchase in 5 years. If your savings account earns 6% interest compounded semiannually, how much do you need to deposit now to meet your goal?

1. Samantha borrows $2,400, agreeing to pay it back with 1.5% annual interest after 15 months. How much interest will she pay?

2. A retiree invests $5,000 in a savings plan that pays 4% per year. What will the account balance be at the end of the first year?

3. Evelyn invests $15,000 into an account at an annual rate of 0.5% simple interest for 24 months.

a. What is the principal in this scenario?

b. What is the interest rate for this account?

c. What number do you use to represent the interest rate in the simple interest formula?

d. What is the length of time of this investment, in years?

e. Calculate the simple interest earned on this account.

4. You deposit $500 in an account earning 6% interest compounded annually. How much will you have in the account in 10 years?