Interest Rate Problems 20

The formula for compound interest is:

$$A = P\ (1+i)^{t}$$

A is amount of money after t years, P is the principal (starting amount), i is the interest rate per year, and t is the number of years.

Example:

Suppose that you have $1500 and put it in a bank. The interest rate is 7%. Find the amount of money you will have after four years.

$A = 1500x(1.07)^4 = 1966.19.$

If the interest is compounded n times per year at an annual interest rate of i, we have;

$$A = P\ \left(1+\frac{i}{n}\right)^{nt}$$

Example:

A $2000 bond pays 8% interest compounded twice per year. It matures in six years. Find the value of the bond at the end of six years.

$A = 2000x(1 + 0.08/2)^{2x6} = 3202.06.$

Questions:

1) An $8000 bond earns 6% interest per year. Interest is compounded yearly.

a) Find the value of the bond after 1 year.

b) Find the value of the bond after 5 years.

2) A small company wants to borrow money. It promises to pay back $53,500 one year after receiving a loan of $50,000. What is the annual interest rate?

3) The rate of interest charged for a loan of $6500 is 4%. Find the amount owing after 10 years if interest is compounded twice per year.

4) Suppose that $1200 is deposited in a bank. The annual interest rate is 4.5%.

a) Find the amount of money at the end of three years if the interest is compounded quarterly (four times per year).

b) Find the amount of money at the end of three years if the interest is compounded monthly.

Answers: 1)a) $8480.00, b) $10,705.81, 2) 7%, 3) $9658.66, 4)a) $1372.41, b) $1373.10.