

## Sec. 8.2 - Compound Interest

Learning Goal:

By the end of today, I will be able to calculate the compound interest for various investments using a variety of periods and interest rates.

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A investment you purchased for \$10,000 earns interest at the rate of 8% per year compounded annually. (compounded means you leave the interest in the bank to earn more interest)

Create a table of values for the investment value for the first 4 years of the investment.

Time	Interest (I=Prt)	Amount	Factored
0	-	10,000	-
1	$10,000(0.08)$	$10,000+10,000(0.08)$	$10,000(1.08)$
2	$[10,000(1.08)](0.08)$	$10,000(1.08) + [10,000(1.08)](0.08)$ or $10,000(1.08) \{1 + 0.08\}$	$10,000(1.08)^2$
3	$[10,000(1.08)^2](0.08)$	$10,000(1.08)^2 + [10,000(1.08)^2](0.08)$ or $10,000(1.08)^2 \{1 + 0.08\}$	$10,000(1.08)^3$
n	$[10,000(1.08)^3](0.08)$	$10,000(1.08)^3 + [10,000(1.08)^3](0.08)$ or $10,000(1.08)^3 \{1 + 0.08\}$	$10,000(1.08)^4$

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## Compound Interest Formula

$$\text{Percentage Growth} \quad A = P (1 + i)^n$$

$$\text{Percentage Decrease} \quad A = P (1 - i)^n$$

where  $P$  is the principal amount,  $A$  is the total amount and  $n$  is the total number of compounding periods, and  $i$  is the interest rate per compounding period.

$$i = \frac{\text{annual interest rate}}{\text{number of periods per year}}$$

$$n = \text{number of compounding periods per year} \times \text{number of years}$$

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### Types of Compounding:

Annually - one interest calculation per year

Semi-annually - two interest calculations per year

Quarter-annually - four interest calculations per year

Monthly - twelve interest calculations per year

Daily - 365 interest calculations per year

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Putting it all together....  $A = P (1 + i)^n$ 

\$2,000 is invested at an annual interest rate of 6% for 5 years. Determine the final amount of the investment for the following scenarios.

(i) compounded annually

(ii) compounded semi-annually

(iii) compounded quarter-annually

(iv) compounded monthly

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Note the more often you compound, the greater the final amount will be. This is especially important to remember when choosing investments and loans.

When you invest YOUR money, you want to \_\_\_\_\_ the number of compounding periods.

When you are borrowing the BANK's money, you want to \_\_\_\_\_ the number of compounding periods.

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Homework

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