

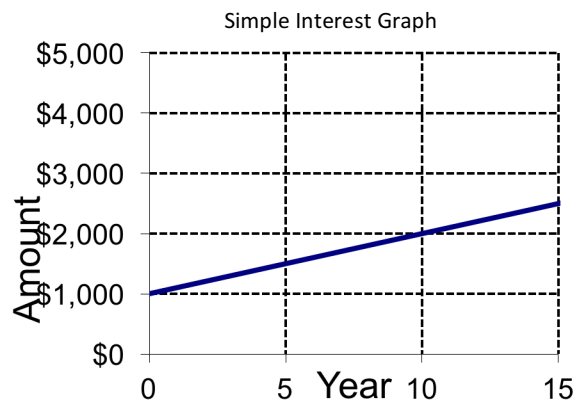
**Financial Applications: Unit Overview**

1. Budgeting
2. Simple Interest
3. Compound Interest
  - Future Value
  - Present Value
4. Annuities
  - Future Value
  - Present Value
  - Applications
    - ✦ Mortgages
    - ✦ Vehicle Purchases

**Definitions**Principal (P):Interest Rate (r):Time (t):Amount (A):Interest (I):/a or per annum:**Simple Interest Formula**

$$I = Prt$$

$$A = P + I$$

*Linear Graph***Example**

John borrows \$1000 from his parents and they charge him 6%/a simple interest. How much does he owe after 5 months?

**More Definitions for Compound Interest***i* = interest rate per compounding period(interest rate  $\div$  100  $\div$  number of times per year interest is calculated)*n* = number of periods(number of years  $\times$  number of times per year interest is calculated)*P* = Principal (Original amount invested or borrowed) This is sometimes referred to as Present Value or PV*A* = Final Amount (includes interest and principal)**Typical Compounding periods**

Compounding Period	Number of Times per year interest is compounded
Annually	
Semi-annually	
Quarterly	
Bi-monthly	
Monthly	
Bi-weekly	
Weekly	
Daily	

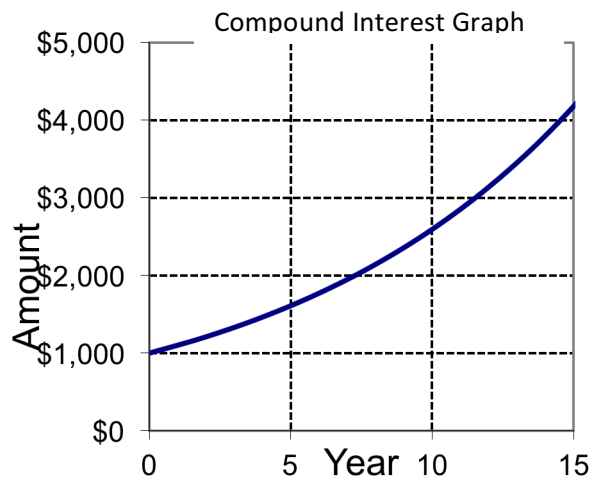
**Example 1:** If the interest rate is 12%/a compounded monthly for 2 years, how many compounding periods are there and what is the interest rate per period.

**Compound Interest Formula** $A = P(1+i)^n$  - future value

or

 $P = A(1+i)^{-n}$  - present value

Exponential Growth Graph

**Examples**

1. Find the future amount of an investment of \$2200 for 5 years at 3.4% per annum compounded monthly.

*i* =*n* =*A* =

$$A = P(1+i)^n$$

Therefore, the investment will be worth \$\_\_\_\_\_ after 5 years.

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2. Rich wants to have \$25 000 in 5 years for a down payment on a house. How much should he invest today at 6.25% per annum, compounded quarterly?

$$i = \quad n = \quad A = \quad P = ?$$

$$P = A(1 + i)^{-n} \quad \text{Notice the negative exponent}$$

Therefore, he should invest \$ \_\_\_\_\_ today.

**Try these yourself!**

Ex. 1. Joe has some money to invest. He buys a 2 year term investment that pays simple interest at 3.35%/a. Calculate the interest earned on a \$50 000 investment.

Ex. 2. Mary invested \$1200 for 2 years in a mutual fund that paid 3.6% interest per year with interest compounded annually.

- Determine the final amount of Mary's investment.
- Calculate the total interest that Mary earned on her investment.

Ex. 3. Mark borrows \$3000 at an interest rate of 4.75% per annum compounded monthly. How much will he owe in 5 years?

Ex. 4. Diana invests \$10 000 in a GIC with an interest rate of 3.4%/a compounded semi-annually. If she is in grade 9 today how much will she have when she graduates ? (Note: she only has 3 ½ years to gain interest)

Answers: 1) \$3350 2a) \$1287.96 b) \$87.96 3) \$3802.44 4) \$11 252.44