**Hmwk: pg 490 # 1, 2ab, 5, (6), 8, 11 , (12)**

 **pg 498 # 4, 5, 6, 9, (10)**

**Simple Interest Revisited**

For simple interest, we are given:

 A = P + I

where

* A is the future value of the account and interest
* P is the principal (initial amount invested)
* I is the total interest earned

Equations that relate the total interest, principal, interest rate and time can be derived from the simple interest triangle as follows:

 I

 P r t

Example 1

Mrs. Gordon invests $2500 in an account that collects 4% simple interest annually. How much is the investment worth in 5 years?

Example 2

Mr. Eyehartmath invests $3000 into a simple interest account that grows to $4500 in 10 years. What was the annual interest rate?

With simple interest accounts, the interest earned is\_\_\_\_ reinvested. As such the interest earned each year is the same and the combined value of the account and interest grows linearly. Most investments do not operate this way.

**Compound Interest**

With compound interest, the interest earned after one term is \_\_\_\_\_\_\_\_\_\_\_ so that interest earned for subsequent terms is made on the sum of the principal and any previous interest that was earned.

The following equation will be used for compound interest:

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

where

* A is the future value of the investment
* P is the principal
* i is the interest that was earned
* n is number of the number of times interest is collected.

**Example 1**

George invests $1000 that earns 12%/a interest compounded annually.

a) Complete the table of values for the future value of the investment over 20 years.

|  |  |
| --- | --- |
| time (yrs) | value of the investment A = P(1 + i)n |
| 0 |  |
| 5 |  |
| 10 |  |
| 15 |  |
| 20 |  |

b) Graph this relation.

A ($)

10000

8000

 0

6000

4000

2000

time (years)

 20

 10

 15

 5

Example 2

How much money must Uncle Leo put into an investment that earns 8%/a interest compounded annually for it to be worth $10000 in 5 years? Create an equation for 'P' then use it to solve this question.

Often, interest is compounded more often than once a year.

|  |  |  |
| --- | --- | --- |
| Compound Period | Interest Rate, i | Number of compounding periods, n |
| annually | unchanged | unchanged |
| semi-annually | divide annual interest by 2 | multiply years by 2 |
| quarterly | divide annual interest by 4 | multiply years by 4 |
| monthly | divide annual interest by 12 | multiply years by 12 |

**Example 3**

Sandra invests $1000 in a mutual fund that earns 8%/a compounded quarterly. How much is it worth after 5 years?

A =

P =

i =

n =

**Example 4**

Shauna wants to have $10000 in the bank in 4 years for post secondary education. How much must she invest today at 6%/a compounded monthly?