Compound Interest

- Compound interest is interest which is added to the original principal.
- You are getting interest on top of interest when you invest into an account that offers compound interest.
- The investment can be compounded by the following periods:
    - Semi-annually –
    - Quarterly –
    - Bi-weekly-
    - Semi-monthly-
    - Annually –
    - Weekly-

Developing the Compound Interest Formula

Example 1: You invest $2000 in an account that earns 7.5% interest per year compounded annually for 5 years.

a) Fill out the table below:

Year	Principle	Interest	Total amount
0	2000	0	2000
1			
2			
3			
4			
5			

b) What is the investment worth after 5 years?

c) Calculate the investment using simple interest. How much more do you make if the money is compounded?

d) Find the common ratio of the total amount. Create an exponential formula that represents the compound interest above.

Compound Interest Formula
You can calculate compound interest by using the formula
$A = P(1 + i)^n$ where..

A = Total amount of investment (or future value)→FV
P = Principal (or present value)→PV
i = Interest rate as a decimal, per compounding period
- $i = r \div N$ where r is the interest rate per annum
                              N is the number of compounding periods per annum

n = Total number of compounding periods
- $n = yN$ where y – number of years

Example 2: Calculate the interest rate (i not R) for an 8%/a investment compounded:
a) semi-annually   b) weekly   c) monthly

Example 3: Calculate the number of compounding periods in the following investments:
   a) Compounded quarterly for 5 years.

   b) Compounded semi-annually for 18 months

   c) Compounded bi-weekly for 2 years

Example 4: Calculate the amount of an investment if $500 is invested at 3% interest compounded quarterly for 3 years.

Example 5: What is the amount of an investment if $650 is invested at 2.45% interest compounded monthly for 3 years?

Example 6:

Natalie invests $18 000 at 8%/a, compounded semiannually.

(a) Determine the value of the investment after four years.

(b) Find the interest at this time.

Example 7:

Determine the present value of an investment that will be worth $5000 in ten years. The interest rate is 4.8%/a, compounded quarterly.

Pg. 490 #4ace, 5, 6, 9-11 (compound interest future value)

Pg. 498 #3ac, 5, 6, 8, 9 (compound interest present value)