Before beginning, we need a quick refresher on "Simple Interest".

The Formula for Simple Interest is given by: $I = Prt$, where I is the amount of interest earned, P is the "Principal" (or the amount getting interest), r is the interest rate, and t is the amount of time interest is calculated.

e.g. You deposit $450 into an account paying 4% per year for 3.5 years. How much interest do you earn?

Example 7.1.1 (*How an annuity works*)

From your text: Pg. 415 #1b)

Complete the table. What is the amount of the annuity? How much interest was earned?

$100 deposited at the end of each month at 6% per year compounded monthly

Month	Starting balance	Interest earned	Deposit	Ending balance
1	$0.00	$0.00	$100.00	$100.00
2	$100.00	$0.50	$100.00	$200.50
3			$100.00	
4			$100.00	

The Simple Ordinary Annuity Formula

$$A = \frac{R[(1+i)^n - 1]}{i}$$

Where:

- A is the final amount of the annuity (what you will have in the bank)
- R is the regular payment you make to the account
- i is the interest rate Per Compounding Period

e.g. If you deposit in an account which pays interest at a rate of **12% PER YEAR**, but is **COMPOUNDED MONTHLY**, then

COMPOUNDED QUARTERLY

Example 7.1.1 (*How an annuity works*)

From your text: Pg. 415 #1b)

Complete the table. What is the amount of the annuity? How much interest was earned?

Interest per month:

$$\frac{0.06}{12} = 0.005$$

$100 deposited at the end of each month at 6% per year compounded monthly

Month	Starting balance	Interest earned	Deposit	Ending balance
1	$0.00	$0.00	$100.00	$100.00
2	$100.00	$0.50	$100.00	$200.50
3	200.50	$1.00	$100.00	301.50
4	301.50	$1.51	$100.00	403.01

$100 \times 0.005 = 0.50$

$200.50 \times 0.005 = \$1.0025$

$\$ 301.50 \times 0.005 = \$1.5075$

The Simple Ordinary Annuity Formula

$$A = \frac{R[(1+i)^n - 1]}{i}$$

Where:

- **A** is the final amount of the annuity (what you will have in the bank)
- *R* is the regular payment you make to the account
- *i* is the interest rate Per Compounding Period

e.g. If you deposit in an account which pays interest at a rate of **12% Per Year**, but is **Compounded Monthly**, then

Compounded Quarterly

Compounded Semi-Annually

Example 7.1.2

Aidricames, at age 20, wants to begin saving money and decides to begin depositing $200 per year into an account which pays interest at 3.25% annually. How much money will accumulate in the account after 45 years?

$$A = R\left[\frac{(1+i)^n - 1}{i}\right]$$

$R = 200$

$i = 0.0325$

$n = 45$

$$A = 200\left[\frac{(1+0.0325)^{45} - 1}{0.0325}\right]$$

$= \$19,799.86$

Example 7.1.3

Rackaygan, at age 40, begins saving money by depositing $400 per year into an account which pays interest at 3.25% annually. How much money will be in the account after 20 years?

Example 7.1.3

Rackaygan, at age 40, begins saving money by depositing \$400 per year into an account which pays interest at 3.25% annually. How much money will be in the account after ~~20~~ 25 years?

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

$$A = \frac{400\left(1+0.0325\right)^{25}-1}{0.0325}$$

$$A = \$15,071.97$$

$R = 400$

$i = 0.0325$

$n = 25$

Example 7.1.4

Willregios deposits \$100 every month into an account which pays 3%, compounded monthly, for 30 years. Determine the amount of the annuity. Determine the amount of interest earned.

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$$A = \left[\frac{R(1+i)^n - 1}{i}\right]$$

$R = 100$

$i = \frac{0.03}{12}$

$i = 0.0025$

$n = (30)(12)$

$= 360$

$$A = 100\left(\frac{(1.0025)^{360} - 1}{0.0025}\right)$$

$A = 58,273.69$

Example 7.1.5

Example 7.1.4

Willregios deposits $100 every month into an account which pays 3%, compounded monthly, for 30 years. Determine the amount of the annuity. Determine the amount of interest earned.

$$A = R\frac{[(1+i)^n - 1]}{i}$$

$R = 350$

$i = \frac{0.047}{4} = 0.01175$

$n = 28$

Example 7.1.5

Determine the amount of a simple ordinary annuity in which $350 is deposited every 3 months, for 7 years, into an account paying interest at a rate of 4.7% compounded quarterly. Determine the amount of interest earned on the account

$$A = \frac{(350((1.01175)^{28})-1)}{28}$$

$350 \times 28 = 9{,}800$

$A = \$11{,}525.14$

$11{,}525.14 - 9800.00 = \$1725.14$ = interest

HW: p. 445 #1a, 5