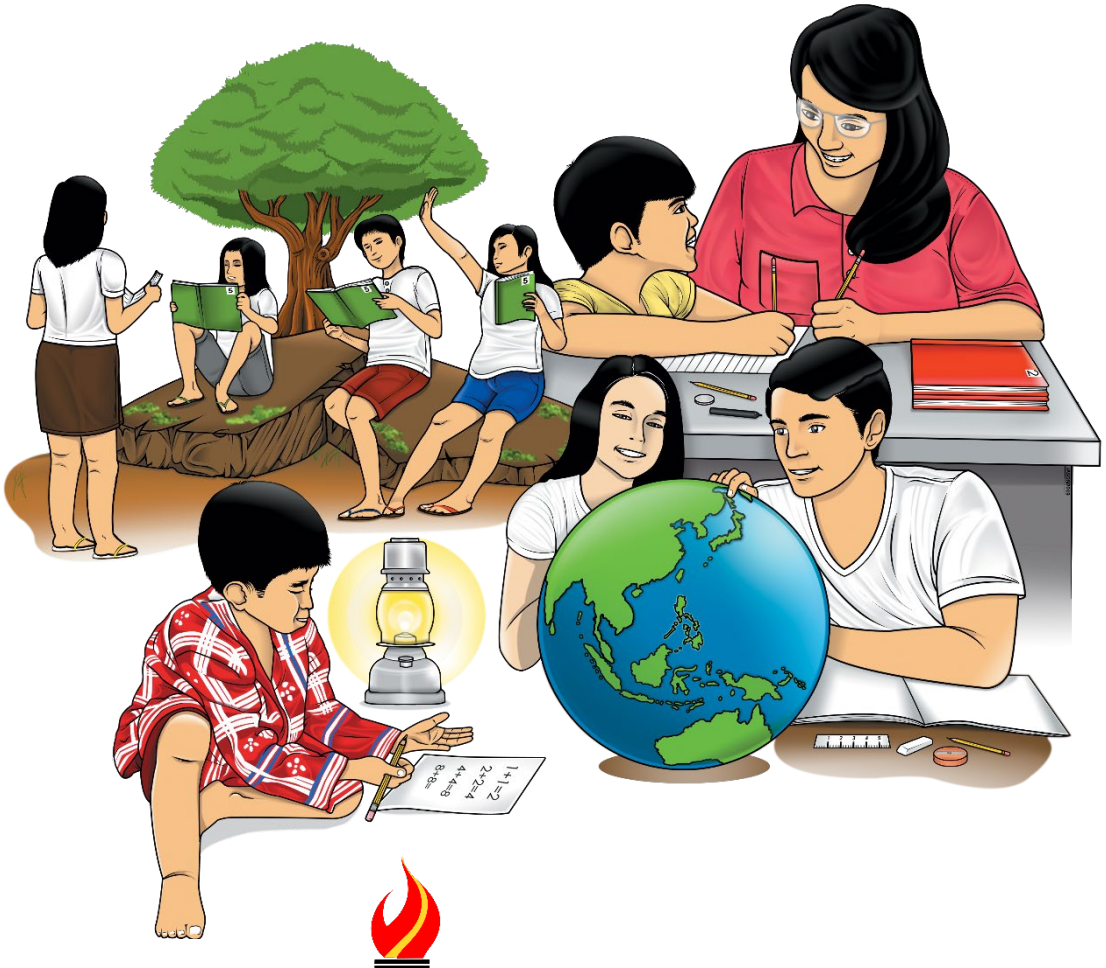
Senior High School

DepED
DEPARTMENT OF EDUCATION

General Mathematics

Quarter 2 – Module 6:
Fair Market Value
of a Cash Flow



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Introductory Message

This Self-Learning Module (SLM) is prepared so that you, our dear learners, can continue your studies and learn while at home. Activities, questions, directions, exercises, and discussions are carefully stated for you to understand each lesson.

Each SLM is composed of different parts. Each part shall guide you step-by-step as you discover and understand the lesson prepared for you.

Pre-tests are provided to measure your prior knowledge on lessons in each SLM. This will tell you if you need to proceed on completing this module or if you need to ask your facilitator or your teacher's assistance for better understanding of the lesson. At the end of each module, you need to answer the post-test to self-check your learning. Answer keys are provided for each activity and test. We trust that you will be honest in using these.

In addition to the material in the main text, Notes to the Teacher are also provided to our facilitators and parents for strategies and reminders on how they can best help you on your home-based learning.

Please use this module with care. Do not put unnecessary marks on any part of this SLM. Use a separate sheet of paper in answering the exercises and tests. And read the instructions carefully before performing each task.

If you have any questions in using this SLM or any difficulty in answering the tasks in this module, do not hesitate to consult your teacher or facilitator.

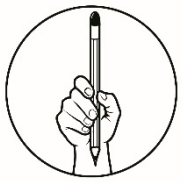
Thank you.

What I Need to Know

This module was written and developed for students to know how to calculate the fair market value of a cash flow whether inflow or outflow that includes an annuity. The topic to be discussed in this module includes comparing and computing the fair market value of goods or properties which is essential in dealing with the next chapter. The language used in this module is appropriate to the diverse communication and language ability of the learners.

After going through this module, you are expected to:

1. calculate the fair market value of a cash flow stream that includes an annuity;
2. compare the fair market value of cash flow; and
3. make a decision based on the market value of cash flow.



What I Know

Choose the letter of the best answer. Write your chosen letter on a separate sheet of paper.

1. What is the term that refers to payment received or payments or deposits made?
   a. annuity
   b. cash flow
   c. fair market value
   d. general annuity

2. What is defined as an annuity where the length of the payment interval is not the same as the length of the interest compounding period?
   a. cash flow
   b. fair market value
   c. general annuity
   d. general ordinary annuity

3. What is the formula to determine the present value of an ordinary annuity?
   a. $P = R\,\frac{1-(1+j)^{-n}}{j}$
   b. $P = R\,\frac{1+(1+j)^{-n}}{j}$
   c. $P = R\,\frac{(1+j)^{n}-1}{j}$
   d. $P = R\,\frac{(1+j)^{n}+1}{j}$

4. What is the other term for fair market value?
    a. annuity
    b. cash flow
    c. economic value
    d. future value

5. It refers to a single amount that is equivalent to the value of the payments stream at that date.
    a. annuity
    b. cash flow
    c. down payment
    d. fair market value

6. It is a general annuity in which the periodic payment is made at the end of the payment interval.
    a. annuity
    b. cash flow
    c. general annuity
    d. general ordinary annuity

7. What is the present value of quarterly payments of ₱ 2,000 for 5 years with an interest rate of 8% compounded quarterly?
    a. ₱ 32,702.87
    b. ₱ 34,702.87
    c. ₱ 33,702.87
    d. ₱ 31,702.87

8. What is the formula to determine the future value of an ordinary annuity?
    a. $F = R\,\frac{1-(1+j)^{-n}}{j}$
    b. $F = R\,\frac{1+(1+j)^{-n}}{j}$
    c. $F = R\,\frac{(1+j)^{n}-1}{j}$
    d. $F = R\,\frac{(1+j)^{n}+1}{j}$

9. What do you call a specific time chosen to compare the time value of one or more dated sums of money?
    a. economic value
    b. focal date
    c. future value
    d. present value

10. What is the future value of quarterly payments of ₱2,000 for 5 years with an interest rate of 8% compounded quarterly?

a. ₱ 46,594.74
b. ₱ 47,594.74
c. ₱ 45,594.74
d. ₱ 48,594.74

11. Cash inflows can be represented by _____ numbers?

a. even
b. negative
c. odd
d. positive

12. How much is the fair market value of shoes if a vendor sells it for ₱1,200. Cedric offers to buy it at ₱1,000 and they agreed at the middle price?

a. ₱1,100
b. ₱1,150
c. ₱1,175
d. ₱1,050

13. What is R in the formula $F = R\ \frac{(1+j)^n - 1}{j}$?

a. future value
b. present value
c. regular payment
d. time

14. How much is the fair market value of the truck if it is originally sold at ₱ 250,000 and Dan offered to buy the truck at ₱ 225,000 to which the seller agreed?

a. ₱ 275,000
b. ₱ 225,000
c. ₱ 250,000
d. ₱ 237,500

15. Cash outflows can be represented by _____ numbers.

a. even
b. negative
c. odd
d. positive

Lesson 1 Fair Market Value of a Cash Flow

Fair market value is the price an asset can be sold in the open market when certain conditions are met. The conditions are as follows: the parties involved are aware of all the facts, are acting in their own interest, are free of any pressure to buy or sell, and have ample time to make decisions. This module focuses on calculating the fair market value of a cash flow stream on an annuity.

What's In

Since our discussion in this module is anchored on the idea of general annuity, let us recall some concepts from the previous lessons on the future and the present values of a general annuity. In this way, it will be easier for you to understand the lesson.

Let us start with the difference between a general annuity and general ordinary annuity. A general annuity is defined as an annuity where the length of the payment interval is not the same as the length of the interest compounding period, while the general ordinary annuity is a general annuity in which the periodic payment is made at the end of the payment interval.

Examples of a general annuity include monthly installment payment of a car, lot, or house with an interest rate that is compounded annually and paying a debt semi-annually when the interest is compounded monthly.

Let us also recall how to determine the future and present value of a general ordinary annuity. The future value F and the present value P of a general ordinary annuity is given by

$$F = R\,\frac{(1+j)^n - 1}{j} \qquad \text{and} \qquad P = R\,\frac{1-(1+j)^{-n}}{j}$$

where R is the regular payment
j is the equivalent interest rate per payment interval converted from the interest rate per period; and
n is the number of payments.

Let us have the following examples to further deepen our understanding of the previous lesson which is essential in tackling this module.

Example 1: Suppose Mrs. Remoto would like to save ₱3,000 at the end of each month for six months, in a fund that gives 9% compounded monthly. How much is the amount of future value of her savings after 6 months?

Solution:

Given: R = ₱ 3,000

term t = 6 months

interest rate per annum $i^{(12)} = 0.09$

number of conversions per year m = 12

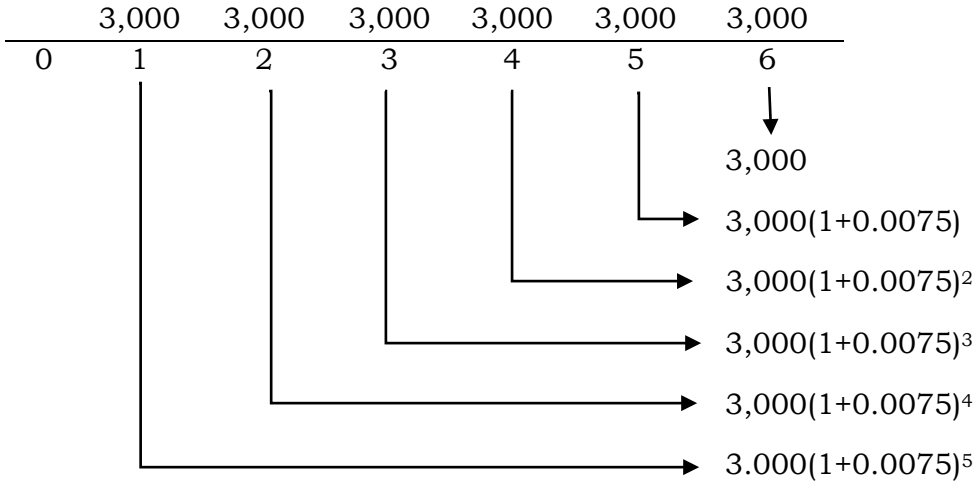
interest rate per period $j = \frac{0.09}{12} = 0.0075$

Find: amount (future value) at the end of the term, F

a.) The cash flow for this problem is given below:

	3,000	3,000	3,000	3,000	3,000	3,000
0	1	2	3	4	5	6

b.) The future value of all the payments at the end of the term (t=6) is given below:



c.) Adding all the future values obtained from the previous step.

3,000 = 3,000

3,000(1+0.0075) = 3,022.5

$3,000(1+0.0075)^2$ = 3,045.16875

$3,000(1+0.0075)^3$ = 3,068.00752

$3,000(1+0.0075)^4$ = 3,091.01757

$3,000(1+0.0075)^5$ = 3,114.20020

F =18,340.89

d.) Let us solve using the formula

$$F = R\,\frac{(1+j)^n - 1}{j}$$

$$F = 3{,}000\,\frac{(1+0.0075)^6 - 1}{0.0075}$$

$$F = 18{,}340.89$$

Example 2: Suppose Mrs. Remoto (in problem no.1) would like to know the present value of her monthly deposit of ₱ 3,000 when interest is compounded monthly. How much is the present value of her savings at the end of 6 months?

Solution:

Given: R = ₱3,000

term t = 6 months

interest rate per annum $i^{(12)} = 0.09$

number of conversion per year m = 12

interest rate per period $j = \frac{0.09}{12} = 0.0075$

Find: Present value, P

a.) The cash flow for this problem is given below:

	3,000	3,000	3,000	3,000	3,000	3,000
0	1	2	3	4	5	6

b.) Discount the payment of each period to the beginning of the term that is, find the present value of each payment. Recall the formula:

$$P = \frac{F}{\left(1 + \frac{i^m}{m}\right)^{mt}} = \frac{3{,}000}{1.0075^t} = 3{,}000(1.0075)^{-t}$$

	3,000	3,000	3,000	3,000	3,000	3,000
0	1	2	3	4	5	6

$3{,}000(1.0075)^{-1}$

$3{,}000(1.0075)^{-2}$

$3{,}000(1.0075)^{-3}$

$3{,}000(1.0075)^{-4}$

$3{,}000(1.0075)^{-5}$

$3{,}000(1.0075)^{-6}$

c.) Adding all the discounted payments to get the present value.

$3{,}000(1.0075)^{-1}$ = 2,977.667

$3{,}000(1.0075)^{-2}$ = 2,955.501

$3{,}000(1.0075)^{-3}$ = 2,933.50

$3{,}000(1.0075)^{-4}$ = 2,911.663

$3{,}000(1.0075)^{-5}$ = 2,889.988

$3{,}000(1.0075)^{-6}$ = 2,868.474

P =17,536.79

d.) Let us solve using the formula

$$P = R\,\frac{1-(1+j)^{-n}}{j}$$

$$P = 3{,}000\,\frac{1-(1+0.0075)^{-6}}{0.0075}$$

$$P = 17{,}536.79$$

Examples 3 and 4 are left for you to try to find the future value (F) and present value (P).

Example 3: In order to save for her high school graduation, Marie decided to save ₱ 200 at the end of each month. If the bank pays 0.250% compounded monthly, how much will her money be at the end of 6 years?

Example 4: Mr. Ribaya paid ₱ 200,000 as a down payment for the car. The remaining amount is to be settled by paying ₱16,200 at the end of each month for 5 years. If interest is 10.5% compounded monthly, what is the cash price of his car.

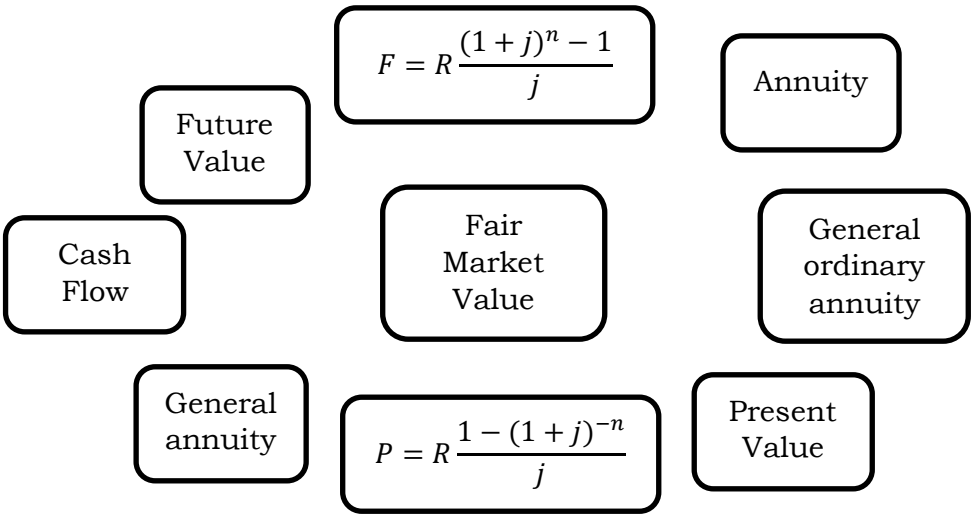
Notes to the Teacher

The present and future values of an annuity are also related by

$$F = P\,(1+j)^n \text{ and } P = \frac{F}{(1+j)^n}$$

What's New

CONCEPT MAPPING: Make a concept map from the given words below by arranging the word into an idea and connect by either a word or a phrase.



Rubric for the above activity:

	Excellent (10 points)	**Good** (8 points)	**Fair** (6 points)	**Poor** (4 points)	**Score**
Organization	The presentation was well organized and in logical formation.	The presentation was thoroughly organized and easy to follow most of the time.	The presentation was somewhat organized and somewhat incoherent.	The presentation was somewhat confusing.	
Content and Concept	Shows an understanding of the topic's content and no misconceptions are evident.	Shows a few misunderstandings of the topic's content and few misconceptions are evident.	Shows lack of understanding of the topic's content and some misconceptions are evident.	Shows no understanding of the topic's content and many misconceptions are evident.	
Knowledge of Relationship among Concepts	All words accurately connected and shows an understanding of the relationship among them.	All words accurately connected and shows some understanding of the relationship among them.	Most words accurately connected and shows a little understanding of the relationship among them.	Some words accurately connected and shows no understanding of the relationship among them.	
				Total	

What is It

Concept maps are visual representations of information. They can take the form of charts, graphic organizers, tables, flowcharts, Venn diagrams, timelines, or T-charts. Concept maps are especially useful for students who learn better visually, although they can benefit any type of learner.

In the previous activity, you need to arrange the given words logically in the form of either chart, organizers, flowcharts, etc. and connect the words by either word or phrase to convey a meaningful idea. The concept you have formed will be essential in the discussion of this topic.

After you finish the activity, try to answer the following:

1. Have you organized the words logically?
2. What idea or concept have you learned from the activity?
3. How can you define domain and range?

If you find difficulty in doing the activity, that is okay because after you read more about this module on how to determine the fair market value of a cash flow stream, you are free to go back to our activity and try to re-arrange the words in a logical way.

Fair Market Value of a Cash Flow

Cash flow is a term that refers to payments received (cash inflows) or payments or deposits made (cash outflows). Cash inflows can be represented by positive numbers and cash outflows can be represented by negative numbers. It is also the amount of cash and cash-equivalents being transferred into and out of the business.

The fair market value or economic value of cash flow (payment stream) on a particular date refers to a single amount that is equivalent to the value of the payments stream at that date. This particular date is called the focal date. In its simplest sense, fair market value (FMV) is the price that an asset would sell for on the open market.

Example 1. Mr. Ribaya received two offers on a lot that he wants to sell. Mr. Ocampo has offered ₱ 50,000 and a ₱1 million lump-sum payment 5 years from now. Mr. Cruz has offered ₱ 50,000 plus ₱ 40,000 every quarter for five years. Compare the fair market values of the two offers if money can earn 5% compounded annually. Which offer has a higher market value?

Given:

Mr. Ocampo's Offer	Mr. Cruz's offer
₱ 50,000 down payment	₱ 50,000 down payment
₱ 1,000,000 after 5 years	₱ 40,000 every quarter for five years

Find: Fair market value of each offer

Solution:

Let us illustrate the cash flows of the two offers using time diagrams.

Mr. Ocampo's offer:

50,000					1 million
0	1	2	3	4	5

Mr. Cruz's offer:

50,000					
	40,000	40,000	40,000	…	40,000
0	1	2	3	…	20

Choose a focal date and determine the values of the two offers at that focal date. For example, the focal date can be the date at the start of the term.

Since the focal date is at t=0, compute for the present value of each other.

Mr. Ocampo's offer: Since ₱ 50,000 is offered today, then its present value is still ₱50,000. The present value of ₱ 1,000,000 offered 5 years from now is:

$$P = F(1+j)^{-n}$$

$$P = 1{,}000{,}000\ (1+0.05)^{-5}$$

$$P = ₱\ 783{,}526.17$$

Fair Market Value (FMV) = Down payment + Present Value

= 50,000+ 783,526.17

FMV = ₱ 833,526.17

Mr. Cruz's offer: We first compute for the present value of a general annuity with quarterly payments but with annual compounding at 5%.

Solve the equivalent rate, compounded quarterly, of 5% compounded annually.

$$F_1 = F_2$$

$$P\left(1+\frac{i^4}{4}\right)^{(4)(5)} = P\left(1+\frac{i^1}{1}\right)^{(1)(5)}$$

$$\left(1+\frac{i^4}{4}\right)^{20} = \left(1+\frac{0.05}{1}\right)^5$$

$$1+\frac{i^4}{4} = (1.05)^{1/4}$$

$$\frac{i^{(4)}}{4} = (1.05)^{1/4} - 1$$

$$\frac{i^{(4)}}{4} = 0.01227$$

The present value of an annuity is given by

$$P = R\,\frac{1-(1+j)^{-n}}{j}$$

$$P = 40{,}000\,\frac{1-(1+0.1227)^{-20}}{0.012272}$$

$$P = ₱\,705{,}588.40$$

Fair Market Value (FMV) = Down payment + Present Value

= 50,000 + 705,588.40

(FMV) = ₱ 755.588.40

Hence, Mr. Ocampo's offer has a higher market value. The difference between the market values of the two offers at the start of the term is

833,526.17 – 755,588.40 = ₱ 77,937.77

Alternate solution (Focal date at the end of the term):

Mr. Ocampo's offer:

The future value of ₱1,000,000 at the end of the term at 5% compounded annually is given by

$$F = P\,(1+j)^n$$

$$F = 50{,}000\,(1+0.05)^5$$

$$F = 63{,}814.08$$

The fair market value of this offer at the end of the term is 63,814.08 plus ₱ 1,000,000 amounting to ₱ 1,063,814.08.

Mr. Cruz's offer:

The future value of this ordinary general annuity is given by

$$F = R\ \frac{(1+j)^n - 1}{j}$$

$$F = 40{,}000\ \frac{(1+0.01227)^{20} - 1}{0.012272}$$

$$F = 900{,}489.71$$

The future value of 50,000 at the end of the term is ₱63,814.08, which was already determined earlier.

Fair Market Value (FMV) = 900,489.71 + 63,814.08 = ₱ 964,303.79

As expected, Mr. Ocampo's offer still has a higher market value, even if the local date was chosen to be at the end of the term. The difference between the market values of the two offers at the end of the term is

1,063814.08 – 964,303.79 = ₱ 99,510.29

You can also check that the present value of the difference is the same as the difference when the focal date was at the start of the term:

$$P = 99{,}510.29\ (1 + 0.05)^{-5} = ₱\ 77{,}968.92$$

Example 2. Company A offers ₱150,000 at the end of 3 years plus ₱300,000 at the end of 5 years. Company B offers ₱25,000 at the end of each quarter for the next 5 years. Assume that money is worth 8% compounded annually. Which offers has a better market value?

Given:

Company A	**Company B**
₱150,000 at the end of 3 years	₱25,000 at the end of each quarter for the next 5 years
₱300,000 at the end of 5 years	

Find: the fair market value of each offer

Solution:

Illustrate the cash flow of the two offers using time diagrams.

Company A offer:

			150,000		300,000
0	1	2	3	4	5

Company B offer:

	25,000	25,000	25,000	…	25,000
0	1	2	3	…	20

Suppose that selected focal date is the start of the term. Since the focal date is the start of the term, compute for the present value of each offer.

Company A offer:

The present value of ₱ 150,000 three years from now is

$$P_1 = F\,(1+j)^{-n}$$

$$P_1 = 150{,}000\,(1+0.04)^{-6}$$

$$P_1 = ₱\,118{,}547.18$$

The present value of ₱300,000 five years from now is

$$P_2 = F\,(1+j)^{-n}$$

$$P_2 = 300{,}000\,(1+0.04)^{-10}$$

$$P_2 = ₱\,202{,}669.25$$

Fair Market Value (FMV) $= P_1 + P_2$

$= 118{,}547.18 + 202{,}669.25$

$=₱321.216.43$

Compute for the present value of a general annuity with quarterly payments but with semi-annual compounding at 8%.

Solve the equivalent rate, compounded quarterly, of 8% compounded semi-annually.

$$F_1 = F_2$$

$$P\left(1+\frac{i^4}{4}\right)^{(4)(5)} = P\left(1+\frac{i^2}{2}\right)^{(2)(5)}$$

$$\left(1+\frac{i^4}{4}\right)^{20} = \left(1+\frac{0.08}{2}\right)^{10}$$

$$1+\frac{i^4}{4} = (1.04)^{\left(\frac{1}{2}\right)}$$

$$\frac{i^4}{4} = (1.04)^{\left(\frac{1}{2}\right)} - 1$$

$$\frac{i^4}{4} = 0.01980$$

The present value of an annuity is given by

$$P = R\,\frac{1-(1+j)^{-n}}{j}$$

$$P = 25{,}000\,\frac{1-(1+0.01980)^{-20}}{0.01980}$$

$$P = ₱\,409{,}575.91$$

Therefore, Company B offer is preferable since its market value is larger.

Example 3. Kat received two offers for investment. The first one is ₱150,000 every year for 5 years at 9% compounded annually. The other investment scheme is ₱12,000 per month for 5 years with the same interest rate. Which fair market value between these offers is preferable?

Solution:

Let the focal point be the end of the term, and so, compute for the future value.

First offer (ordinary annuity)

Given: R = ₱150,000, $i^{(1)}$ = 0.09, m=1, t=5, n=5 payments

$$F = R\ \frac{(1+j)^n - 1}{j}$$

$$F = 150{,}000\ \frac{(1+0.09)^5 - 1}{0.09}$$

$$F = ₱\,897{,}706.59$$

Second offer: (General Annuity)

Given: R = 12,000, $i^{(1)}$=0.09, m = 1, n = (5)(12)=60 monthly payment interval

Convert 9% compounded annually to its equivalent interest rate for monthly payment interval.

$$P\left(1 + \frac{i^{(12)}}{12}\right)^{(12)} = P\left(1 + \frac{i^{1}}{1}\right)^{1}$$

$$\left(1 + \frac{i^{(12)}}{12}\right)^{(12)} = (1 + 0.09)$$

$$\frac{i^{(12)}}{12} = (1.09)^{\left(\frac{1}{12}\right)} - 1$$

$$\frac{i^{(12)}}{12} = j = 0.00721$$

Find the future value of this investment

$$F = R\ \frac{(1+j)^n - 1}{j}$$

$$F = 12{,}000\ \frac{o0ppol^{60} - 1}{po[=l1+0.00721)}{0.00721}$$

$$F = ₱\,896{,}869.86$$

What's More

Activity 1.1

Complete the table by computing the future value and present value of an ordinary annuity given the following conditions.

		Future Value (F)	Present Value (P)
1.	Monthly payments of ₱ 3,000 for 4 years with an interest rate of 3% compounded quarterly.		
2.	Quarterly payments of ₱ 5,000 for 10 years with an interest rate of 2% compounded annually.		
3.	Semi-annual payments of ₱105,000 with an interest rate of 12% compounded annually for 5 years.		

Activity 1.2

Complete the table by filling up the columns with the required values.

		R	i^m	m	t	n	Converted interest rate (j)	F	P
1.	Monthly payments of ₱ 2,000 for 5 years with an interest rate of 12% compounded quarterly.								
2.	Quarterly payments of ₱ 15,000 for 10 years with an interest rate of 8% compounded annually.								
3.	Semi-annual payments of ₱ 150,000 with an interest rate of 6% compounded annually for 6 years.								

Activity 1.3

Answer the following problems:

1. The buyer of a car pays ₱ 169,000 cash and ₱ 12,000 every month for 5 years. If money is 10% compounded monthly, how much s the cash price of the car?
2. The buyer of a lot pays ₱ 50,000 cash and ₱ 10,000 every month for 10 years. If money is 8% compounded monthly how much is the cash value of the lot?

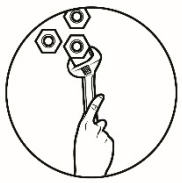
What I Have Learned

Fill in each blank with correct word or words to complete each statement.

1. _____ is defined as an annuity where the length of the payment interval is not the same as the length of the interest compounding period while _____ is a general annuity in which the periodic payment is made at the end of the payment interval.

2. A _____is a term that refers to payments received (_____) or payments or deposits made (_____). Cash inflows can be represented by _____ numbers and cash outflows can be represented by _____ numbers. It is also the amount of cash and cash-equivalents being transferred into and out of the_____.

3. The fair market value or _____ of a cash flow (payment stream) on a particular date refers to a single amount that is equivalent to the value of the payments stream at that date. This particular date is called the _____.



What I Can Do

Answer the problem given below by showing your complete solution and your decision on a sheet of paper.

1. A television set is for sale at ₱ 13,499 in cash or on installment terms, ₱ 2,500 each month for the next 6 months at 9% compounded annually. If you were the buyer, what would you prefer, cash or installment?

Assessment

Choose the letter of the best answer.

1. What is the other term for economic value?
   a. fair market value
   b. future value
   c. general annuity
   d. present value

2. The formula $R\,\frac{(1+j)^n-1}{j}$ is used to determine the _____ of an ordinary annuity.
   a. annuity
   b. cash flow
   c. future value
   d. present value

3. What is the future value of a semi-annual payments of ₱ 8,000 for 12 years with interest rate of 12% compounded semi-annually?
   a. ₱ 407,524.60
   b. ₱ 408,524.60
   c. ₱ 405,524.60
   d. ₱ 406,524.60

4. Cash _____ can be presented by positive numbers.
   a. flows
   b. inflows
   c. outflows
   d. value

5. How much is the original selling price of shoes being sell by the vendor if Cedric offers to buy it at ₱ 1,000 and they agreed at its fair market value of ₱ 1,150?

    a. ₱ 1,200
    b. ₱ 1,100
    c. ₱ 1,000
    d. ₱1,300

6. It is the price an asset would sell for on the open market when certain conditions are met.

    a. annuity
    b. cash flow
    c. down payment
    d. fair market value

7. What is the present value of an ordinary annuity having semi-annual payments of ₱8,000 for 12 years with an interest rate of 12% compounded semi-annually?

    a. ₱ 110,402.90
    b. ₱ 100,402.90
    c. ₱ 105,402.90
    d. ₱ 103,402.90

8. Cash _____ can be represented by a negative number.

    a. flows
    b. inflows
    c. outflows
    d. value

9. It is an annuity where the length of the payment interval is not the same as the length of the interest compounding period.

    a. cash flow
    b. fair market value
    c. general annuity
    d. general ordinary annuity

10. The formula $R\,\frac{1-(1+j)^{-n}}{j}$ is used to determine the _____ of an ordinary annuity.

    a. future value
    b. present value
    c. real value
    d. zero value

11. It is the amount of cash and cash-equivalents being transferred into and out of the business.

    a. cash flow
    b. fair market value
    c. general annuity
    d. general ordinary annuity

12. What is the future value of an ordinary annuity having daily payments of ₱ 50 for 30 days with an interest rate of 20% compounded daily?

    a. ₱ 1,611.98
    b. ₱ 1,511.98
    c. ₱ 1,411.98
    d. ₱ 1,311.98

13. A store sells a washing machine. Mark offers to give a down payment of ₱5,000 and pay ₱6,000 at the end of every 6 months for two years. Assuming that the money compounds by 3% monthly. What is the economic value of the washing machine?

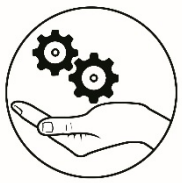
    a. ₱ 24,545.42
    b. ₱ 23,126.31
    c. ₱ 20,000
    d. ₱ 28,126.31

14. What is $\boldsymbol{n}$ in the formula $F = R\ \frac{(1+j)^n - 1}{j}$?

    a. future value
    b. present value
    c. number of payments
    d. regular payment

15. What is the present value of an ordinary annuity having daily payments of ₱ 50 for 30 days with an interest rate of 20% compounded daily?

    a. ₱ 1,587.33
    b. ₱ 1,487.33
    c. ₱ 1,387.33
    d. ₱ 1,687.33



Additional Activities

Decide on the following problems by determining the fair market value. Show your solutions in a sheet of paper together with your decision on the problem.

1. Investment in Sunrise Company is ₱ 100,000 at the end of 5 years plus ₱ 24,000 annually for 4 years afterwards. Investment in XYZ company offers ₱ 50,000 semi-annually ₱ 15,000 every 6 months after 6 years. Assume that the money is worth 9% compounded annually, which investment is preferable?

2. A motorcycle is for sale ₱ 60,500 cash or on installment terms ₱ 3,000 per month for 2 years at 12% compounded annually. If you were the buyer, what would you prefer, cash or installment?

Answer Key

What I Know

1. b
2. c
3. a
4. c
5. d
6. d
7. a
8. c
9. b
10. d
11. d
12. a
13. c
14. b
15. b

Assessment

1. a
2. c
3. d
4. b
5. a
6. d
7. b
8. c
9. c
10. d
11. a
12. b
13. d
14. c
15. b

What's More

Activity 1.1

	F	P
1.	₱152,379.36	₱135,537.43
2.	₱220,630.08	₱180,993.53
3.	₱1,372,987.26	₱779,069.84

Activity 1.2

	R	i^m	m	t	n	j	F	P
1.	₱2,000	0.12	12	5	60	0.009902	₱162,823.88	₱90151.63
2.	₱15,000	0.08	4	10	40	0.019427	₱894,851.52	₱528,728.78
3.	₱150,000	0.06	2	6	12	0.029563	₱2,123,527.28	₱1,497,002.94

Activity 1.3

1. Cash Price = 169,000 + 564,784.43 = ₱733,784.43
2. Cash Value = 50,000 + 824,214.81 = ₱874,214.81

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