DEFERRED ANNUITY

- At the end of this lesson, you should be able to calculate the present value and period of deferral of a deferred annuity.

- Richard and Lhea are trying to invest money in a bank. They are thinking which deferral period will they use to earn more money in five years. Which deferral period is better if their money is compounded monthly? Is it deferred for six months or deferred for 18 months?

Froilan bought a house to be paid ₱₱2500 every three months for 10 years deferred for 18 months. Find the present value and the period of deferral if money is worth 10% interest compounded quarterly.

- **Deferred annuity** is an annuity in which the first payment interval is not made at the beginning nor end of the payment interval, but at a later date.
- **Deferral period** is the length of time from the present to the beginning of the first payment interval.
- **Present value** is the amount of money to be invested or to be paid today.

Formula:

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

- A*def*=the present value of a deferred annuity
  R= periodic payments of deferred annuity
  t= term
  m= compounding period
  n= the length of the term or number of payment (t×m)
  j= interest rate
  i= interest rate per conversion period (j/m)
  p= number of paying periods
  d= number of deferred periods (mxp)

- **Step 1:** Identify what is asked.

present value

- **Step 2:** Identify what are given.
- ₱R=₱2500
  t=10 years
  m=4
  n=t×m=10×4=40
  j=10%=0.10
  i=jm=0.104=0.025
  p=18 months=1.5 years

d= m x p= 4 x 1.5 = 6

- **Step 3:** Identify which formula is to be used.

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

- **Step 4:** Substitute the given values to the formula.

$$A_{def} = 2500\left[\frac{(1+0.025)^{-6} - (1+0.025)^{-(40+6)}}{0.025}\right]$$

- **Step 5:** Solve the problem.
- ₱54 115.11

- Find the present value of an annual payment of ₱700 which is worth 5% compounded annually. The first payment is made at the end of 7 years and the last payment is made at the end of 15 Year

- **Step 1:** Identify what is asked.
- *present value*
- **Step 2:** Identify what are given.
- ₱R=₱700
  t=9 years
  m=1
  n=t×m=9×1=9
  j=5%=0.05
  i=jm=0.051=0.05
- d=7(1)–1=6 (note that the first payment will be at the 7th year)

- **Step 3:** Identify which formula is to be used.

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

- **Step 4:** Substitute the given values to the formula.

$$A_{def} = 700\left[\frac{(1+0.05)^{-6} - (1+0.05)^{-(9+6)}}{0.05}\right]$$

- **Step 5:** Solve the problem.

$A_{def} = ₱3712.78$

TIP

- Deferred annuity is better than ordinary annuity due since the amount of the deferred annuity is lower than the amount of ordinary annuity due. However, in terms of a loan, it is better to have an ordinary annuity due.

KEY POINTS

- **Deferred annuity** is an annuity in which the first payment interval is not made at the beginning nor end of the payment interval, but at a later date.
- **Deferral period** is the length of time from the present to the beginning of the first payment interval.
- **Present value** is the amount of money to be invested or to be paid today.