

**CASE STUDIES IN FINANCE: Kate Myers**

After graduating from Ohio State University with a degree in Finance, Kate Myers took a position as a stock broker with Merrill Lynch in Cleveland. Although she had several college loans to make payments on, her goal was to set aside funds for the next eight years in order to make a down payment on a house. After considering the various suburbs of Cleveland, Kate chose Lakewood as her desired future residency. Based on median house price data, she learned that a three-bedroom, two-bath house currently costs \$98 000. Kate wants to make a down payment of 20 per cent.

Because it will be eight years before Kate buys a house, the \$98 000 price will surely not be the same in the future. To estimate the rate at which the median house price will increase, she considered the historical price appreciation in Lakewood. In the past, homes appreciated by nearly four per cent per annum. Kate was satisfied with this estimation. Merrill Lynch provides several opportunities for Kate to invest the funds that will be devoted to the purchase of her future home. She feels that a balanced account containing stocks, bonds, and government securities would realistically achieve an annual rate of return of eight per cent.

**Questions:**

1. Taking into consideration the fact that the \$98,000 home price will grow at four per cent per year, what will be the future median home selling price in Lakewood in eight years?
2. What amount will Kate Myers have to accumulate as a down payment if she does decide to buy a house in Lakewood?
3. Based on your answer from Question 1, how much will have to be deposited into the Merrill Lynch account (which earns eight per cent per year) at the end of each month to accumulate the required down payment?
4. If Kate decides to make end-of-the-year deposits into the Merrill Lynch account, how much would these deposits be?
5. If homes in Lakewood appreciate by six per cent per annum over the next eight years instead of the assumed four per cent, how much would Kate have to deposit at the end of each month to make the down payment?
6. What if the appreciation in home prices is only by two per cent per year, how much would Kate have to deposit at the end of each month to make the down payment?
7. If Kate decided to deposit her down payment funds in less risky certificates of deposit (CDs) earning only four per cent, how much would she have to deposit at the end of each month to make the down payment?
8. If Kate pursued a more risky investment of growth stocks that have an expected return of 12 per cent, how much would she have to deposit at the end of each month to make the down payment?

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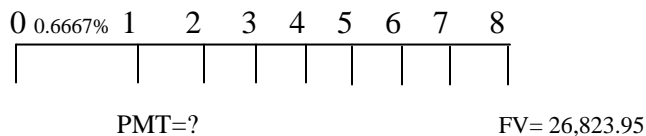
## Answers

1.  $FV_8 = \$134,119.767$
2. Down payment = \$ 26,823.95
3. PMT (each month) = \$ 200.340
4. PMT (each year) = \$ 2521.85
5.  $FV_8 = \$156,197.111$ , Down payment = \$ 31,239.42, PMT = \$ 233.355
6.  $FV_8 = \$114,822.619$ , Down payment = \$ 22,964.524, PMT = \$ 171.542
7. PMT (each month) = \$237.555
8. PMT (each month) = \$167.726

## Hints for Solving Questions

Find out the increase in home prices each year up to year 8.

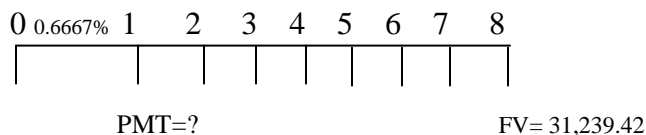
1.  $FV_1 = PV \times 1.04$   
 $FV_2 = FV_1 \times 1.04$   
 $FV_3 = FV_2 \times 1.04$   
 $FV_4 = FV_3 \times 1.04$   
 $FV_5 = FV_4 \times 1.04$   
 $FV_6 = FV_5 \times 1.04$   
 $FV_7 = FV_6 \times 1.04$   
 $FV_8 = FV_7 \times 1.04$
2. Down Payment = 20% of value of home price in the 8<sup>th</sup> year.
3. Find out the PMT by using down payment as the Future Value.



4. Use  $n = 8$ ,  $i = 8\%$
5.  $FV_1 = PV \times 1.06$   
 $FV_2 = FV_1 \times 1.06$   
 $FV_3 = FV_2 \times 1.06$   
 $FV_4 = FV_3 \times 1.06$   
 $FV_5 = FV_4 \times 1.06$   
 $FV_6 = FV_5 \times 1.06$   
 $FV_7 = FV_6 \times 1.06$   
 $FV_8 = FV_7 \times 1.06$

Then find out down payment.

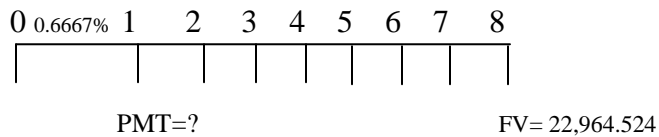
Then find out PMT amount each month by using down payment amount as year 8 value.



$$\begin{aligned}
 6. \quad &FV_1 = PV \times 1.02 \\
 &FV_2 = FV_1 \times 1.02 \\
 &FV_3 = FV_2 \times 1.02 \\
 &FV_4 = FV_3 \times 1.02 \\
 &FV_5 = FV_4 \times 1.02 \\
 &FV_6 = FV_5 \times 1.02 \\
 &FV_7 = FV_6 \times 1.02 \\
 &FV_8 = FV_7 \times 1.02
 \end{aligned}$$

Then find out down payment.

Then find out PMT amount each month by using down payment amount as year 8 value.



7. If home prices appreciate by 4% and the return on investment is 4%  
First find  $i_{per}$  then  $n$  then calculate **PMT** by using down payment amount (26,823.95) as year 8 value.
  8. If home prices appreciate by 4% and the return on investment is 12%  
First find  $i_{per}$  then  $n$  then calculate **PMT** by using down payment amount (26,823.95) as year 8 value.
- \* *We are keeping down payment as year 8 value as we have to reach the goal of accumulating this amount by the end of 8 years.*