Solution HA11

Each Question carry 2.5 points.

Pg850 Q11 IF you finance \$15,000 for 3 years at 6% compounded monthly, the monthly payments will be

Solution:

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

$$\therefore d = \frac{A(1+i)^n i}{(1+i)^n - 1}$$

$$= \$456.3290$$

$\boxed{\text{ANSWER OPTION A about \$456}}$

Pg852 Q15 In September 2004 you could buy a new Kia Amanti Car for \$24,995 with a loan from the manufacturer at 0% (!) interest over 60 months. Assume that you had cash or a trade-in worth \$2000. What was the monthly payment?

Solution: \$24995 − \$2000 (cash or trade in worth)

\$22995

$$\text{Monthly payment} = \frac{\$22995}{60}$$

$\boxed{= \$383.5}$

Pg852 Q16 For the same car mentioned in Exercise 17, a car dealer offered a 7.9% APR conventional loan over 48 months but a 6.8% APR conventional loan over 60 months?

a) What is the payment per \$1000 under each loan?

Solution: Payment over \$1000 will be given as

$$d = \frac{Ai}{1-(1+i)^{-n}}$$

i) for 48 month period

$d = \$24.366$

i) for 60 month period

$d = \$19.70$

b) With the 60-month loan, it takes longer for the dealer to be paid in full. So what is the advantage to the dealer in offering a lower percentage for 60 month instead of a higher percentage loan for 48 months? (Thanks to Terence Blows of Northern Arizona University.)

Solution

Full payment received in 48 months $= 48 \times 24.366$
$= \$1169.568.$

Full payment received in 60 months $= 60 \times 19.70$
$= \$1182$

However their is a marginal difference in total payment received by the dealer over entire length.

One reason may be that longer period given greater flexibility to the customer to pay back as monthly payment for them is less [In this case \$19.7 for 60 months]

Q852Q41 Fisher's effect (Chapter 21 p 817) gives the real rate for borrowing, sometimes called the real cost of capital. Suppose that you buy a house with a $100000 mortgage at an interest rate of 6.75% and that inflation remains at 3% for the duration of the mortgage. You make monthly payments in constantly deflating dollars. Simplify the situation by supposing that you sell the house one month after you buy it (the neighbours really drove you crazy, right from the start)

a) What would the house sell for if it kept up with inflation of 3%/12 = 0.25% per month?

<u>Solution</u>

$P = \$100000$

$R = 6.75\%$

$a = 0.25\%$

Selling price of house $= P(1+a)$

$= \$100250$

b) Calculate you mortgage payment at the end of the month. How much is interest and how much is principal?

i) Payment $\Rightarrow$ $A = d\dfrac{[1-(1+i)^{-n}]}{i}$

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

$$\boxed{= \$648.60}$$

ii) Equity left to be paid after one month.

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

$$= \$99914.19513$$

$\therefore$ Amount paid is $= \$100000 - \$99914.19513$

$= \$85.80487$

iii) Principal $= \boxed{\$85.80487}$

Interest $= \$648.60 - \$85.80487$

$\boxed{= \$562.79513}$

c) After making the mortgage payment, paying off the balance of the $100,000 cost of the house and selling the house for the amount in part (a), how much did it cost you to own the house for the month?

i) Monthly payment = $648.60

ii) Equity left on house to be paid after one month = $99914.19513.

$\therefore$ Total expenses = 99914.19513 + 648.60
= 100562.7951

iii) Selling price of house from part (a) = 100250

Cost to own house = 100562.7951 − 100250
$\boxed{= \$312.7951}$

d) The cost in part (c) is in deflated dollars, using a formula from Chapter 21, convert this to constant (month-before) dollars and divide by $100000 to express the result as a percentage rate. This is the real rate of interest?

Amount in part c) = $312.7951

i) formula for constant Month before dollars

$$\frac{\$312.7951}{\left(1 + \frac{0.03}{12}\right)}$$

$= \$312.015$

ii) Dividing by $100000 = $\frac{312.015}{100000}$

$= 312.015 \times 10^{-6}$

Rate of Interest = $0.312015 \times 10^{-3} \times 12$
$= 0.00374418$
$\boxed{= 3.74418\ \%}$