

Calculation of future values exam question essay



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Q1. Given the recent drop in mortgage interest rates, you have decided to refinance your home. Exactly 4 years ago, you obtained a Rs. 275, 000. 00 15-year mortgage with a fixed of 11% APR, compounded monthly. Today, you can get a 15-year loan for the currently outstanding loan balance at 8% interest, compounded monthly.

This loan, however, requires you to pay a Rs. 250 appraisal fee and 3 points at the time of the refinancing (1 point equals 1% of the amount borrowed). Ignore tax considerations. If you refinance, how much will your new monthly payments be after you refinance? Answer - 1Solution:-Borrowed Amount P. V. A (11%, 15yrs) (Refer P.

V. A table) Now, we will ascertain the interest amount for 4 years a) So, $2,75,000 - 38242 = 2,36,758$ (11%, 15yrs) So, the monthly installment amount would be $3,1862,36,758 - 33,909 = 2,02,849$ (11%, 14yrs) $2,02,849 - 30,051 = 1,72,798$ (11%, 13 yrs) $1,72,798 - 26,617 = 1,46,180$ (11%, 12 yrs) Working of part 1 sums:- Appraisal Charges - 250/- (1) And $3\% * 1,46,180 = 4,386$ (2) So, adding 1 & 2 we get 4,636 Again, by applying the formula we can find out per month instalments charges on 1,46,180 Borrowed Amount P. V. A (8%, 15yrs) (Refer P. V.

A table)= 17,077 for 1 year 12= 1,423 for one month @ 8% Q2. Ramesh and Laxmi wish to buy a new home. The price is Rs56,500.00 and they plan to put 12% down. New Rahat Savings and Loan will lend them the remainder at a 12% fixed rate APR (Annual Percent Rate) for 30 years, with monthly payments to begin in one month.

(Ignore taxes.) Suppose Ramesh wants to pay off the loan in 15 years. How much extra must he pay each month to do so? Answer - 2Solution:-Formula:

$$NFA = A \left(\frac{1}{i} - \frac{1}{i(1+i)^n} \right) 56500 * \frac{12}{100} = 6780 \quad (56500 - 6780 = 49720) 49720$$

$$= \text{Annuity} \left(\frac{1}{0.01} - \frac{1}{0.01(1.01)^{180}} \right)$$

$$01)360)49720 = \text{Annuity} \left(\frac{1}{0.01} - \frac{1}{0.339} \right) = \text{Annuity} (100 - 2.78) = 97.$$

$$22511.$$

$$42 \text{ for 30 YEARS } 49720 = \text{Annuity} \left(\frac{1}{0.01} - \frac{1}{0.01(1.01)^{180}} \right) = \frac{1}{0.01} - \frac{1}{0.01(5.}$$

$$01(5.$$

$$99) = \frac{1}{0.01} - \frac{1}{0.0599} = (100 - 16.69) 596.87 \text{ for 15 years Answer: } 85.$$

46Q3. You are trying to plan for retirement in 24 years and currently you have Rs63,000.00 in a savings account and Rs24,500.00 in stock.

In addition you plan on adding to your savings by depositing Rs7,000.00 per year in your SAVINGS account at the end of each of the next 10 years and then Rs19,000.00 per year at the end of each year for the final 14 years until retirement. Assuming your savings account returns 8% compounded annually while your investment in stocks will return 2% compounded annually, how much will you have when you retire in 24 years? [Ignore taxes.] Answer - 3Given, 1.

Present value of savings = Rs. 63,000
Rate of interest = 8% compounded annually
Time Period = 24 years
2. Present value of stock = Rs. 24,500
Rate of interest = 2% compounded annually
Time Period = 24 years
3.

Present value = Rs. 7,000
 Time Period = 10 years
 4. Present value = Rs. 19,000
 Time Period = 14 years
 We will have to find the future value of the savings and stocks available now. Solution:-
 Formula: Future Value = Present Value $(1+r/100)^n$
 \Rightarrow Future Value of savings = $63,000 (1+8/100)^{24} = 63,000 (1.08)^{24} = 63,000 * 6$.

34 approx. = Rs. 3,99,494.38
 \Rightarrow Future Value of stocks = $24,500 (1+2/100)^{24} = 24,500 (1.02)^{24} = 24,500 * 1.608 = \text{Rs.}$

39,396
 \Rightarrow Future value = $7000[(1.08)^{10}-1/0.08] = 7000 * 14.375 = \text{Rs. } 1,00,625$
 \Rightarrow Future Value = $19000[(1.08)^{14}-1/0.08] = 19000 * 24.212 = \text{Rs. } 4,60,037$.

Now adding up all the four, we find out that when we retire after 24 years we are left with (Future Value), Rs. (3,99,494.38 + 39,396 + 1,00,625 + 4,60,037).

5) = Rs. 9,99,552.88
 Q4. Suppose you buy a new Toyota for Rs15,000.00, paying nothing down.

You agree to a repayment schedule of sixty (60) equal monthly payments beginning one month from today. The banker's required return is 10% annually. How much will you owe on the car after 16 months? Answer -
 4 Given, Present value of future annuity = Rs. 15,000
 Interest = 0.10

Time = 60 installments
 We have to find out the annuity. Solution:-
 Present value of F. A. = Annuity $[1/i - 1/i(1+i)^n]$
 $15,000 = \text{Annuity} [1/0.10 - 1/0.10(1.10)^{60}]$

$15,000 = \text{Annuity} (10 - 0.1362)$
 $15,000 = \text{Annuity} (9.8638)$

48-73. 42) $15,000 = \text{Annuity} (47.06)$ $\text{Annuity} = 15,000/47.06$ $\text{Annuity} = \text{Rs.}$

318. 742Q5. Brijesh, who recently sold his Scorpio, placed Rs16,000.00 in a savings account paying annual compound interest of 7%.

Calculate the amount of money that will have accrued if he leaves the money in the bank for 19 years. Answer - 5
 Given, Present value of savings = Rs. 16,000
 Rate of interest = 7%
 Time period = 19 years
 We need to find out the future value of the current savings. Solution:-
 $\text{Future value} = \text{present value} (1+r/100)^n = 16,000(1+7/100)^n = 16,000(1.07)^{19} = 16,000(3.616)$
 Therefore, the Future Value of the current savings = Rs.

57,864. 44Q6. You need to have Rs18,000.00 in 5 years.

If money is placed into a savings account paying annual compound interest of 2%, how much money must be deposited today in order to have the required amount? Answer - 6
 Given, Future value of the current saving = Rs. 18,000
 Time Period = 5 years
 Rate of interest = 2%
 We need to find out the money to be deposited today to get the required amount. Solution:-
 $\text{Future value} = \text{present value} (1+r/100)^n$
 $18,000 = \text{present value} (1+2/100)^5$
 $18,000 = \text{present value} (1.02)^5$
 $18,000 = \text{present value} (1.104)$

Therefore, the present value of the investment will be, Rs. 16,304.35Q7.

You are going to place Rs11,000.00 in an investment paying compound interest of 16%, compounded monthly. Calculate the APY (Annual Percent Yield) on this investment? Answer - 7
 Given, Rate of Interest = 16%

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value of investment = Rs. 11000 Interest on monthly basis = $16/12 = 1.33$

We have to find out the Annual Percent Yield.

Solution:-Future Value = Present Value $(1+r/100)^n = 11,000 (1+0.133)^{12}$

Annual Percent Yield (APR) = Rs. 12889.

Q8. You need to have Rs56,000.00 in 8 years. If you place Rs1,000.00 into a savings account today, what interest rate per year must you earn in order to have the required amount? Answer - 8
Given, Future value = Rs. 56,000
Present value = Rs.

1,000
Time Period = 8 years
We need to find the rate of interest at which we must earn in order to have the required amount. Solution:- $FV = PV(1+i)^n$
 $56000 = 1000(1+i)^8 = 0.65$ i. e.

$0.65 * 100 = 65\%$
Therefore, the rate of interest is 65%
Q9. You need to have Rs57,000.00. If Rs18,000.00 is placed into a savings account today that pays annual compound interest of 16%, how many years will it be before you have the required amount? Answer - 9
Given, Future value = Rs.

57,000
Present value = Rs. 18,000
Rate of interest = 16%
We need to find the time period by which we will get the return. Solution:- $Future\ value = present\ value (1+rate/100)^n$
 $57,000 = 18,000(1+16/100)^n$
 $\log 57 = \log 18 + n \log 1.16$
 $n = 8$.

Therefore, the time period is 8.33.
Q10. Bank A is advertising that they are paying compound interest of 9%, compounded Semi-annually. What rate would Bank B advertise if they compound Quarterly? (Convert Bank A's rate

to Bank B's compounding interval) Answer - 10 Solution:- For solving the above question we assume the amount to be as Rs.

1000 then when the rate is calculated semi annually then time period = $6 \times 2 =$

12 When compounded quarterly will give = $6 \times 4 = 24$ (since the rate of bank A is being converted into rate of bank B) When compounded semi annually: We

write the expression as $1000(1 + \frac{9}{100})^{12}$ which comes out to be Rs 2812

(equation 1) When compounded quarterly: We write the expression as

$2812(1 + \frac{r}{100})^{24}$ (equation 2) When the equation 1 ; 2 is solved we get the

rate as 39%. Analysis Answer - 1 For the new monthly payments be after you

refinance the borrowed amount is to be calculated using the present value of

annuity in order to get our desired output. Answer - 2 Ramesh and Laxmi has

to pay some extra amount if they wants to payoff in 15 years which is to be

calculated using Net Factor of Annuity. Answer - 3 We find out that when we

retire after 24 years we are left with a desired amount using the formula of

future value of the savings and stock. Answer - 4 For calculating the amount

left at the end of 16 mts we calculate it through annuity. Answer - 5 The

amount of money that will have accrued if he leaves the money in the bank

for 19 years by calculating it through Future Value. Answer - 6 Money that

must be deposited today in order to have the required amount is to be

calculated using Future Value. Answer - 7 The APY (Annual Percent Yield) on

this investment is to be calculated using its formula. Answer - 8 Interest rate

per year must you earn in order to have the required amount through Future

Value. Answer - 9 Years that will be needed before you have the required

amount is to be calculated by Future Value. Answer - 10 Rate at which would

be taken by Bank B advertise if they compound Quarterly will be calculated
by Compound rate of interest.????????? Financial Management