If your investment is growing at a rate less than the rate of inflation,

Solution: because of inflation (which is greater than rate of growing) the value of dollar will be less as compared to previous years and since it is greater in number it will impose a negative impact on your investment.

Option B] you do not have a positive real growth in your investment.

On October 1, 2001, you could buy a U.S Treasury 10 year note with a yield of 4.53%. At that time, the inflation rate was about 3.12%

a) What was the real growth rate of this investment?
Solution: \( g = \frac{r - \pi}{1 + \pi} = \frac{0.0453 - 0.03}{1 + 0.03} = 0.01387 \approx 1\% 

b) For an individual with a combined federal, state & city income tax rate of 30%, what was the real growth rate of this investment?
Solution: Real growth rate = \( 0.01387 - 0.3 \times 0.01387 = 0.009709 \approx 0.97\% \)

Your car dealer offers to finance a $6000 addition loan at 3% to be repaid in four years of monthly payments. What is the monthly payment?
Solution: \[ A = P(1+rt) = 6000(1+0.03x4) = 6720 \]

Monthly payment = \[ \frac{6720}{48} = \$140 \]

**OPTION A**

\[ P \times 0.85 \times 8 \text{ for the same proceeds from a loan (the amount the borrower gets), the same number of months and same rate of interest, have note: in question above we already calculated for add on loan for discounted loan} \]

\[ x \times (1-0.03x4) = 6000 \]

\[ x = \frac{6000}{0.88} = 6818.18 \]

Now in order to take loan of amount 6000 using discounted loan the principal amount would be 6818.18.

\[ \text{Monthly payment} = \frac{6818.18}{48} = \$42.045 \]

\[ \therefore \text{an add loan is always cheaper than a discounted loan} \]

**OPTION B**

\[ P \times 0.83 \text{ You need to buy a car and need to finance \$5000 of the cost. The dealer offers you a 5.92% add on loan to be repaid in monthly installments over four years. How much is your monthly payment?} \]

**Solution:** \[ A = P(1+rt) = 5000(1+0.059x4) = 6180 \]

\[ \text{Monthly payment} = \frac{6180}{48} = \$128.75 \]

\[ P \times 0.87 \text{ Suppose that you need \$1000 (no less) and have available to you either an add on loan or a discounted loan, both at the same interest rate and for the same period. Which will have lower monthly payment?} \]

**Solution:** Let \[ r = 5\% \quad t = 4 \text{yrs} \]. Note: Monthly payment = MP

- **Add-on loan** \[ A = P(1+rt) = 1000(1+0.05x4) = 1200 \]
  \[ \text{MP} = \frac{1200}{48} = \$25 \]

- **Discounted loan** \[ \therefore x(1-0.05x4) = 1000 \Rightarrow x = \frac{1000}{0.8} = 1250 \]
  \[ \text{MP} = \frac{1250}{48} = \$26.417 \]

\[ \text{Add-on loan always have a lower payment} \]