

Interest Rates Homework

In addition to finishing the material from class:

- You buy a house.
 1. You pay a set amount, p , every month. Set up a differential equation for the amount, M that you owe every month, if the interest rate is r .
 2. Solve this differential equation, in general (hint should $M - p$ be positive or negative?).
 3. Given $M(0) = \$100,000$ (yeah right!!) and $r = 7.25\%$, and let t be in months. What p will let you keep your principle (the amount you owe on the house) the same.
 4. Why is the situation in the previous question a bad idea? This type of loan is out there, watch out for it, I'm not kidding, the banks try to lend money this way, umm, and that's part of where the mortgage crisis came from.
 5. What monthly payment will allow you to pay this off in 360 months (30 years), 288 months (24 years), 240 months (20 years), and 120 months (10 years)?
 6. How much interest do you pay if you pay this off in 360 months (30 years), 288 months (24 years), 240 months (20 years), and 120 months (10 years)?
- You have a choice between a variable rate on a car loan, and a fixed rate. The car costs \$10,000.
 1. Set up a differential equation to show how this would get paid off for the fixed rate.
 2. The fixed rate is 6.5%. What payment will allow you to pay this off in 5 years (a typical lifetime of a car loan)? You'll have two unknowns in this equation, p , your payment, and the constant in front of your exponential. You can solve both by knowing two different times, the initial condition and what the amount you'll owe after 5 years is.
 3. What's the total amount of money you pay for the car?
 4. With the same fixed rate of 6.5%, you pay off the loan in 3 years. What payment will allow you to pay this off in 3 years?
 5. What's the total amount of money you pay for the car?
 6. With a variable rate one can usually get a lower interest rate; the rate can go down, but often, the rate will go up. Assuming that you can get 5.5% for your variable loan rate. On the anniversary of the car loan (every year after you buy the car, on the date that the car was bought) the interest rate goes up by 1%. If you pay the same amount you would have paid to pay off the car in part 2., how long would it take you to pay off the car?
 7. What's the total amount of money you pay for the car?
 8. How long would it take to pay off the car if you made the payments in part 4.
 9. What's the total amount of money you pay for the car?
 10. And what can we conclude about variable vs. fixed loans?
- 1.2 problem #39 explains about how points work on a mortgage.