

Stat 274 — Winter 2024

Homework Assignment 6

Due: Thursday, March 21st on Learning Suite at 9:30 am

1. You take out a loan for 10000. You pay off the loan with monthly payments of 90 for 10 years.
 - (a) What is the monthly effective rate? What is the annual effective rate? [0.128937%, 1.55827%]
 - (b) What is the outstanding loan balance immediately after the 7th payment? Calculate using both the retrospective and prospective formulas. [9458.16]
 - (c) Assume you miss the 13th and 53rd payments, what will be the outstanding loan balance after the 71st payment? [4460.01]
2. You take out a 30-year mortgage for 250,000 to be repaid with end-of-month payments beginning in one month. The interest rate is 4.8% compounded monthly. Find:
 - (a) The monthly payment amount [1311.67]
 - (b) The balance after 10 years [202,117.53]
 - (c) The balance after 20 years [124,809.94]
 - (d) The total interest paid in the 6th year (payments 61-72)[10,881.84]
 - (e) The total principal paid in the 6th year [4,858.20]
3. For a 25-year loan of 12,000 at 6% nominal annual interest (compounded semiannually) with payments at the end of each half year find the following:
 - (a) The semiannual payment amount [466.39]
 - (b) The outstanding balance after the 20th payment [9,141.26]
 - (c) The amount of interest in the 20th payment [279.83]
 - (d) The amount of principal in the 20th payment [186.56]
 - (e) The amount of interest in the 30th payment [215.67]
4. You take out a 7-year loan of L to buy a new car. You pay off the loan with monthly payments of Q at a yearly effective interest rate of i . The amount of interest paid off in the first payment is \$180.10 and the amount of principle paid off in the 43rd payment is \$438.50. Calculate the loan amount L . (Note: Using the prospective formula when all the payments are equal, the amount of principle paid off in the k^{th} payment is $P_k = Qv^{n-k+1}$). [\$36999.89]
5. Find and work 5 more practice problems on loans. You can find those:

- In the online practice problems
- In the study manuals
- In the book
- Ask the TA's to write one
- In your purchased software (Infinite Actuary, Coaching Actuaries, Actex, etc.)