

PSTAT 171. HW 3 (Winter 2021)

Instruction: Review textbook chapters 2 and 3 (up to section 3.5) first. Multiple reading might help. Then try to solve the homework problems quickly.

1. A buyer of a 2018 Toyota RAV4 has a choice of 0% financing for 60 months or a \$ 3,000 cash back incentive. He plans to make no down payment. The buyer is able to qualify for 3.9 % annual effective financing for 5-years with level end-of-month payments through his credit union and thereby take advantage of the cash back incentive. Let Y denote his negotiated price for the RAV4. Suppose $Y \geq \$32900$. Which would be preferable, the 0 % dealer financing or the \$ 3,000 cash back incentive?
2. Tracy receives payments of \$ X at the end of each year for n years. The present value of her annuity is \$ 493. Gary receives payments of \$ $3X$ at the end of each year for $2n$ years. The present value of his annuity is \$ 2,748. Both present values are calculated at the same annual effective interest rate. Find v^n .
3. Given that $a_{\overline{n+1}|i} - a_{\overline{n}|i} = .177208656$ and $\ddot{a}_{\overline{n+1}|i} - \ddot{a}_{\overline{n}|i} = .185248436$, find the integer n .
4. Suppose that $\ddot{a}_{\overline{n}|i} = 31.61667882$ and $s_{\overline{n+1}|i} = 64024.90944$. Determine i and n .
5. Suppose \$ 40,000 was invested on January 1, 1980 at an annual effective interest rate of 7% in order to provide an annual (calendar-year) scholarship of \$ 5,000 each year forever, the scholarships paid out each January 1. In what year can the first \$ 5000 scholarship be made?
6. Given $54\ddot{a}_{\infty|i} = 1000$, find $s_{\overline{22}|i}$.
7. Alice owned an annuity which had level annual payments for twelve consecutive years, the first of these being in exactly twelve years. She sold it, and the selling price of \$ 21,092.04 was based on a yield rate for the investor of 7.8%. What is the amount of the level payments?
8. Catfish Hunter's 1974 baseball contract with the Oakland Athletics called for half of his \$100,000 salary to be paid to a life insurance company of his choice for the purchase of a deferred annuity. More precisely, there were to be semi-monthly contributions in Hunter's name to the Jefferson Insurance Company with the first payment on April 16 and the final payment on September 30.2 We suppose that the first eleven of these were to be for \$ 4,166.67, and the final payment was to be for four cents less. ($\$ 4,166.67 \times 12 = \$ 50,000.04$.) Using an annual effective interest rate of 6 % (a rate that figures in a six-year personal loan of \$ 120,000 that Oakland's owner Charlie Finley had made to Hunter in 1969 and then promptly recalled), find the value of the specified payments to the insurance company at the scheduled time of the last payment. (Hunter wished to have such an annuity in lieu of immediate salary for tax reasons. Finley claimed that he was fulfilling the contract when he offered Hunter a \$ 50,000 check at the end of the season. Finley's default on his contractual obligation led to Hunter's historic free agency. The New York Yankees signed Hunter to a five-year, \$ 3,750,000 contract.)
9. Mr. Bell buys a home for an unspecified amount. He pays a down payment of \$ 20,000 and finances the remainder for 15 years with level end-of-month payments of \$1,692. The annual effective interest rate for the first five years is 4 %, and thereafter it is 6%. Mr. Bell sells the house just after making his 100th mortgage payment. The selling price is \$ 258,000. How much money will Mr. Bell get at closing? (Remember, the loan holder is paid first, and then Mr. Bell receives the balance of the inflow from the resale.)