MATH 370 Z – Lecture 2
Annuities and Perpetuities

Today:
1. Annuity Immediate/Due
2. Perpetuities

In Class Exercises:
1. An investment requires an initial payment of 10,000 and annual payments of 1,000 at the end of each of the first 10 years. Starting at the end of the eleventh year, the investment returns five equal annual payments of X. Determine X to yield an annual effective rate of 10% over the 15-year period.

2. A perpetuity-immediate pays X per year. Brian receives the first n payments, Colleen receives the next n payments, and Jeff receives the remaining payments. Brian's share of the present value of the original perpetuity is 40%, and Jeff's share is K. Calculate K.
3. Susan and Jeff each make deposits of 100 at the end of each year for 40 years. Starting at the end of the 41st year, Susan makes annual withdrawals of $X$ for 15 years and Jeff makes annual withdrawals of $Y$ for 15 years. Both funds have a balance of 0 after the last withdrawal. Susan’s fund earns an annual effective interest rate of 8%. Jeff’s fund earns an annual effective interest rate of 10%. Calculate $Y - X$.

4. Carol and John shared equally in an inheritance. Using his inheritance, John immediately bought a 10-year annuity-due with an annual payment of 2500 each. Carol put her inheritance in an investment fund earning an annual effective interest rate of 9%. Two years later, Carol bought a 15-year annuity-immediate with annual payment of $Z$. The present value of both annuities was determined using an annual effective interest rate of 8%. Calculate $Z$. 