3 Steps:

1. Draw the timeline, mark the payments
2. Find the “Present”
3. Choose actuarial notations

In Class Exercises:

1. Victor wants to purchase a perpetuity paying 100 per year with the first payment due at the end of year 11. He can purchase it by either:
   (i) paying 90 per year at the end of each year for ten years; or
   (ii) paying K per year at the end of each year for the first 5 years and nothing for the next 5 years.

Give K.

2. Eloise plans to accumulate 100,000 at the end of 42 years. She makes the following deposits:
   (i) X at the beginning of years 1-14
   (ii) No deposits at the beginning of years 15-32, and
   (iii) Y at the beginning of years 33-42

The annual effective interest rate is 7%.

X - Y = 100

Give Y.
3. Chuck needs to purchase an item in 10 years. The item costs 200 today, but its price inflates at 4% per year. To finance the purchase, Chuck deposits 20 into an account at the beginning of each year for 6 years. He deposits an additional X at the beginning of years 4, 5, and 6 to meet his goal. The annual effective interest rate is 10%. Calculate X.

4. Mark receives 500,000 at his retirement. He invests 500,000-X in an annual payment of 10-year annuity-immediate and X in an annual payment perpetuity-immediate. His total annual payments received during the first 10 years are twice as large as those received thereafter. The annual effective rate of interest is 6%. Calculate X.