1. (25%) Jeff bought an increasing perpetuity-due with annual payments starting at 5 and increasing by 5 each year until the payment reaches 100. The payments remain at 100 thereafter. The annual effective interest rate is 7.5%. Determine the present value of this perpetuity.

   (A) 700   (B)735   (C)760   (D)785   (E)810

2. (25%) Jeff and Jason spend X dollars to purchase an annuity. Jeff buys a perpetuity-immediate, which makes annual payments of 30. Jason buys a 10-year annuity-immediate, also with annual payments. The first payment is 53, with each subsequent payment k% larger than the previous year’s payment. Both annuities use an annual effective interest rate of k%. Calculate k.

   (A) 5   (B)5.33   (C)5.50   (D)5.67   (E)6

Your answers: (Leave blank if you need no grading)
3. (25%) A senior executive is offered a buyout package by his company that will pay him a monthly benefit for the next 20 years. Monthly benefits will remain constant within each of the 20 years. At the end of each 12-month period, the monthly benefits will be adjusted upwards to reflect the percentage increase in the CPI. You are given:

- (i) The first monthly benefit is \( R \) and will be paid one month from today.

- (ii) The CPI increases 3.2% per year forever

At an annual effective rate of 6%, the buyout package has a value of $100,000. Calculate \( R \).

(A) 517  (B) 538  (C) 540  (D) 548  (E) 563

4. (25%) Mary is to receive an annuity with 30 annual payments. The first payment of $1,000 is due immediately and each successive payment is 5% less than the payment for the preceding year. Interest 12% compounded annually. Determine the present value of this annuity. [CAS 11/92 #20]

(A) Less than $6,400
(B) At least $6,400, but less than $6,500
(C) At least $6,500, but less than $6,600
(D) At least $6,600, but less than $6,700
(E) At least $6,700