1. (25%) At an annual effective interest rate of \( i, i > 0\% \), the present value of a perpetuity paying 10 at the end of each 3-year period, with the first payment at the end of year 6, is 32.

At the same annual effective rate of \( i \), the present value of a perpetuity paying 1 at the end of each 4-month period, with first payment at the end of 4 months, is \( X \).

Calculate \( X \).

(A) 38.8  (B) 39.8  (C) 40.8  (D) 41.8  (E) 42.8

2. (25%) At a nominal rate of interest \( i \), convertible semiannually, the present value of a series of payments of 1 at the end of every 2 years, forever is 5.89.

Calculate \( i \)

A. 6%  B. 7%  C. 8%  D. 9%  E. 10%

Your answers: (Leave blank if you need no grading)
3. (25%) The present value of a series of payments of 2 at the end of every eight years, forever, is equal to 5.

Calculate the effective rate of interest.

A. 0.023  B. 0.033  C. 0.040  D. 0.043  E. 0.052

4. (25%) Mary deposits 1000 into a fund at the beginning of each for 10 years. At the end of 15 years, she makes an additional deposit of X.

At the end of 20 years, Mary uses the accumulated balance in the fund to buy a perpetuity-immediate with annual payments of 2000 per year for 10 years, and 1000 per year thereafter.

Interest is credited at an annual effective rate of 5%.

Calculate X.

A. 4865  B. 5065  C. 5265  D. 5465  E. 5665