1. (20%) To accumulate 8000 at the end of 3n years, deposits of 98 are made at the end of each of the first n years and 196 at the end of each of the next 2n years.
   The annual effective rate of interest is i. You are given \((1+i)^n = 2.0\).
   Determine i.
   
   (A) 11.25%  (B) 11.75%  (C) 12.25%  (D) 12.75 %  (E) 13.25%

2. (20%) Jim borrowed 10,000 from Bank X at an annual effective rate of 8%. He agreed to repay the bank with five level annual installments at the end of each year.
   At the same time, he also borrowed 15,000 from Bank Y at an annual effective rate of 7.5%. He agreed to repay this loan with five level annual installments at the end of each year.
   He lent the 25,000 to Wayne immediately in exchange for four annual level repayments at the end of each year, at an annual effective rate of 8.5%.
   Jim can only reinvest the proceeds at an annual effective rate of 6%.
   Immediately after repaying the loans to the banks in full, determine how much Jim has left.
   
   (A) 323  (B) 348  (C) 373  (D) 398  (E) 423

Your answers: (Leave blank if you need no grading)

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3. (20%) Jim began saving money for his retirement by making monthly deposits of 200 into a fund earning 6% interest compounded monthly. The first deposit occurred on January 1, 1985. Jim became unemployed and missed making deposits 60 through 72. He then continued making monthly deposits of 200.

How much did Jim accumulate in his fund on December 31, 1999?

(A) 53,572  (B) 53,715  (C) 53,840  (D) 53,966  (E) 54,184

4. (20%) The present values of the following three annuities are equal:
   (i) Perpetuity-immediate paying 1 each year, calculated at an annual effective interest rate of 7.25%
   (ii) 50-year annuity-immediate paying 1 each year, calculated at an annual effective interest rate of j%
   (iii) n-year annuity-immediate paying 1 each year, calculated at an annual effective interest rate of j-1%

Calculate n.

(A) 30  (B) 33  (C) 36  (D) 39  (E) 42

5. (20%) Deposits of 1000 are placed into a fund at the beginning of each year for 30 years. At the end of the 40th year, annual payments commence and continue forever.

Interest is at an effective annual rate of 5%.

Calculate the annual payment.

(A) 5441  (B) 5431  (C) 5421  (D) 5411  (E) 5401