MAP 4170   Name:_____
Test 2   Date: March 4, 2014

Show sufficient work and clearly mark your answers. Each problem is worth 10 points.

1. An annuity has payments of 100 at the beginning of every 2 years for 20 years.
    Determine the accumulated value of the annuity one year after the final payment
    using an annual effective interest rate of 6%.

    (A) 1395

    (B) 1785

    (C) 1895

    (D) 2005

    (E) 2125

2. A 5-year annuity immediate with semiannual payments has an initial payment of 30.
    Subsequent payments are 3 less than their preceding payment. Determine the present
    value of the annuity six months before the first payment using an annual effective
    interest rate of 5%.

    (A) 135

    (B) 140

    (C) 145

    (D) 150

    (E) 155

3. A perpetuity due has annual payments that form a geometric progression with common ratio 1.04. The initial payment 10. The present value of the perpetuity is 1050 using an annual effective interest rate of i. Determine i.

(A) 4.90%

(B) 4.95%

(C) 5.00%

(D) 5.05%

(E) 5.10%

4. Jason deposits of 100 into an account at the end of each year for 20 years. Interest on the deposits is paid annually using an annual effective interest rate of i. The interest payments are reinvested into another account that pays an annual effective interest rate of 6%.

Chris deposits of 100 into an account at the end of each year for 20 years. Interest on the deposits is paid annually using an annual effective interest rate of $i + .02$. The interest payments are reinvested into another account that pays an annual effective interest rate of 6%.

Determine how much more Chris has than Jason at the end of 20 years.

(A) 185

(B) 195

(C) 440

(D) 560

(E) 630

5. An arithmetically increasing perpetuity due with semiannual payments has a present
    value of 4680 using a nominal interest rate 8%, compounded semiannually.
    Determine the amount of the 3rd payment, given the amount of the 8th payment is 54.

    (A) 15

    (B) 16

    (C) 17

    (D) 18

    (E) 19

6. An annual payment annuity has an initial payment of 3. Subsequent payments are 8
    more than their preceding payment until reaching a payment of 115, after which
    subsequent payments are 8 less than their preceding payment until reaching a final
    payment of 3. Determine the present value of this annuity one year before the first
    payment using an annual effective interest rate of 6%.

    (A) 730

    (B) 775

    (C) 795

    (D) 870

    (E) 920

7. Determine the accumulated value of a 20-year annuity immediate with annual payments of 100 using an annual effective interest rate of 5% for the first five years, 8% for the next five years, and 12% thereafter.

   (A) 5800

   (B) 5875

   (C) 5950

   (D) 6025

   (E) 6100

8. For the first 15 years, a perpetuity immediate with annual payments, and initial payment of 7, has subsequent payments that are 17.81% more than their preceding payments. Thereafter, payments are 2% more than their preceding payments. Using an annual effective interest rate of 7.1%, determine the present value of the perpetuity.

   (A) Less than 650

   (B) Greater than or equal to 650, but less than 700

   (C) Greater than or equal to 700, but less than 750

   (D) Greater than or equal to 750, but less than 800

   (E) Greater than or equal to 800

9. Using an annual effective interest rate of i, the accumulated value of a $3n$-year
    annuity immediate with annual payments of $3K$ is triple the accumulated value of a
    $2n$-year annuity immediate with annual payments of $2K$. Also using i, the present
    value of an n-year annuity immediate with annual payments of 1 is 7.64.
    Determine i.

    (A) 5.0%

    (B) 5.1%

    (C) 5.2%

    (D) 5.3%

    (E) 5.4%

10. Rounded to the nearest dollar, determine the present value of a 10-year annuity due
    with monthly payments of 100 using an annual effective interest rate of 6%.

    (A) 9007

    (B) 9052

    (C) 9072

    (D) 9117

    (E) None of the above