Solution to FIN 533 Homework
Due Tuesday, October 22, 2009

1. Calculate the duration of the liability: $\frac{1.10}{0.10} - \frac{10}{(1.10)^{10} - 1} = 4.7255$ *years*
2. Since the first payment is in 5 years (rather than one—at the end of the year), then add four years, so D=8.7255 years

3. Set the duration of the asset portfolio equal to the duration of the liability:
   $Asset\ duration = w(5) + [(1-w)20] = 8.7255$
   $w = 0.7516$

4. PV of deferred annuity: $41,968.22

5. Money that should be placed in each zero:

   Investment in 5-year zeros = 0.7516($41,968) = $31,543

   Investment in the 20-year zeros = 0.2484($41,968) = $10,425

6. Face values: 5-year $31,543$(1.1)^5$ = $50,800
   20-year $10,425 $(1.10)^{20}$ = $70,134