Solutions to Practice Homework #1 and #9 from Chapter 22.

On #1 on p. 815, first compute the yearly interest paid. This is \((10,000) \times (0.0551) \times (1) = 551\). Then since the cost of the bond (the amount you actually pay) is $9802, we take the interest and divide by the cost to get the annual yield of the investment, \(551 \div 9802 = 5.62\%\). For the other scenario, the yearly interest is \((10,000) \times (0.1125) \times (30) = 1125\), which is $1125 \div 15,529 = 7.24\% of the cost of the bond.

For part (b), you can compute the total earnings on each bond. For the first, you earn \((10,000) \times (0.0551) \times (30) = 16,530\) in interest. You also get $10,000 back at the end, and the cost to purchase the bond was $9802. Thus, your total earnings are $16,530 + $10,000 - $9802 = $16,728. Similarly, the total earnings for the second bond are \((10,000) \times (0.1125) \times (15) + 10,000 - 15,529 = 11,346\). Note that the second bond is for just 15 years. There is less profit, but you obtain it in half the time.

One might argue that we should use 29.5 years instead of 30 and 14.5 instead of 15 for part (b) since interest is paid in February and the bond is purchased in August. The book is not clear how this should be interpreted, so you may use 29.5 and 14.5 if you prefer.

For problem #9, the reason I was getting the wrong answer in class is that since the payment of $10 is monthly, we must change the interest rate to be an effective monthly rate. To do this we use a formula similar to that for finding the EAR from the APR. Since .04923% is the daily interest rate and if we assume there are 30 days per month, the effective monthly rate is equal to \((1 + .0004923)^{30} - 1 = .0149\), . Then, using the amortization formula from class, we have

\[
490 = 10 \left[ \frac{1 - 1.0149^{-n}}{.0149} \right].
\]

(We use $490 instead of $500 since the first payment is made immediately, before any interest has accrued.) Now we test values for \(n\) and find that 89 is the smallest \(n\) value that makes the right-hand side larger than the left-hand side. Thus, the entire balance will be paid off at the end of 89 months, or 90 months if you count the very first payment. (The book says 91 months, but I don’t get that answer even if I don’t round at all.)