Chapter 4 Conceptual Questions

**NOTE: You didn’t have to write justifications for theses.** *I provided brief justifications for the answers, but there different ways you could correctly justify some of these.*

1. The future value annuity factor $s_{48|0.03/12}$ should be...

   (a) Less than 48
   (b) Exactly 48
   (c) More than 48

   If you make 48 payments, each $ into an account that earns some interest, you should end up with more than 48 dollars in the account (the $48 you put in plus some interest)

2. The present value annuity factor $a_{48|0.03/12}$ should be...

   (a) Less than 48
   (b) Exactly 48
   (c) More than 48

   If you’re paying off a loan, and the process of paying it off involved you making 48 payments, each $1, you must have been loaned less than $48 (since some of your repayments went toward interest)

3. Which is larger $s_{40|0.03/4}$ or $a_{40|0.03/4}$?

   With $s_{n|i}$ the interests helps you.

   Or, if you add 40 payments, each 1 dollar to a savings account, you’ll end up with more than $40, if you repaid a loan with 40 payments, each 1 dollar, the original loan was for less than $40.

4. Which is larger $s_{40|0.03/4}$ or $s_{50|0.03/4}$? (different $n$)

   With the same interest rate on a savings account, you’ll end up with more money in the account if you made 50 payments of 1 dollar rather than 40 payments of 1 dollar.

5. Which is larger $s_{40|0.03/4}$ or $s_{40|0.05/4}$? (different $i$)

   If you’re making 40 payments of 1 dollar each into a savings account, the higher the interest rate is, the more money you’ll have at the end.

6. Which is larger $a_{40|0.03/4}$ or $a_{40|0.03/4}$? (different $n$)

   At the same interest rate, if you make more payments, you’ll be able to borrow more money.

7. Which is larger $a_{40|0.03/4}$ or $a_{40|0.05/4}$? (different $i$)

   If you’re making the same number of payments (each $1), you’ll be able to borrow more money at a LOWER interest rate.
8. Billy took out a car loan for $10,000, and will repay it over 5 years at 6% interest.  
Bob took out a car loan for $10,000, and will repay it over 3 years at 6% interest.  
(a) Who will pay more in interest, Billy or Bob?  
Billy If the amount borrowed and interest rate are the same, you ‘waste’ more money in interest stretching your payments out over a larger period of time.  
(b) Who will have higher monthly payments, Billy or Bob?  
Bob, because he’s paying the loan off more quickly, each payment will be higher.

9. Betty took out a car loan for $10,000, and will repay it over 4 years at 6% interest.  
Brittany took out a car loan for $10,000, and will repay it over 4 years at 8% interest.  
(a) Who will pay more in interest, Betty or Brittany?  
Brittany, for the same term and the same amount of money borrowed, a higher interest rate means you pay more in interest.  
(b) Who will have higher monthly payments, Betty or Brittany?  
Brittany, for the same term and the same amount of money borrowed Brittany will have to pay a little more each month that Betty to pay off her higher interest rate.

10. Bayley took out a car loan for $10,000, and will repay it over 4 years at 6% interest.  
Blair took out a car loan for $15,000, and will repay it over 4 years at 6% interest.  
(a) Who will pay more in interest, Bayley or Blair?  
Blair since interest is a percent of the amount borrowed, higher amount borrowed gives higher interest amount when the interest percent is the same.  
(b) Who will have higher monthly payments, Bayley or Blair?  
Blair to pay back the higher PV and the higher interest amount, Blair is definitely going to pay more each month.

11. Carla started a savings account, where she earned 1% interest. Each week she deposited $10 into the account. (Note $10 * 52 = $520). At the end of 1 year she will have....  
(a) Less that $520 in the account.  
(b) Exactly $520 in the account.  
(c) More that $520 in the account.  
The interest Carla earns adds to her savings account. See also Question 1
12. Christa took out a 1-year loan where her interest was 1%. Each week her loan payments were $10. (Note $10 \times 52 = $520). The amount of money Christa borrowed was...

   (a) **Less that $520.**
       Some of her $520 went to repaying interest, so the amount left to repay the principal is less. See also Question 2
   (b) **Exactly $520.**
   (c) **More that $520.**

13. Darrel borrowed $10,000 in a 5 year loan (you don’t know exactly what his interest rate is). His monthly payments worked out to exactly $200 a month. (So in the first year, Darrel paid $200 \times 12 = $2400 in payments.)

After 1 year the remaining balance on his loan is....

   (a) Less than $10,000 - $2400 = $7600
   (b) Exactly $10,000 - $2400 = $7600
   (c) **More than $10,000 - $2400 = $7600**

Don’t forget about interest! Some of Darrel’s payments went to paying down his interest. So his remaining balance is higher.

14. Devin decided he needed to open a savings account so that we would have $10,000 saved up in 5 years (you don’t know exactly what his interest rate is). He will make monthly payments (5 years of monthly payments is 60 payments.)

His monthly payments will be...

   (a) **Less than $10,000/60 = $166.67**
       Interest helps Devin, so he doesn’t need to deposit the whole $10,000 himself.
   (b) **Exactly $10,000/60 = $166.67**
   (c) **More than $10,000/60 = $166.67**

15. Ezra plans on saving $875,000 in a 401(k) for when he retires (in 43 years). Every other week, $81.50 is deducted from is paycheck and deposited into the 401(k). If the interest rate on the 401(k) account **decreases,** Ezra will need to...

   (a) Decrease his every other weekly payments to meet his $875,000 in 43 years goal.
   (b) **Increase his every other weekly payments to meet his $875,000 in 43 years goal.**

   Interest WAS helping Ezra, now that he’s getting less help he needs to open up his wallet a little wider and pay more of the money himself.