Practice Quiz 3: Consumer Borrowing (Solutions)

1. Janice uses her credit card, which carries a monthly APR of 18%, for all of her everyday purchases. She eventually reaches her credit limit of $4,000 and begins to re-evaluate her credit habits. After considering her budget, she determines to dedicate, at most, $80 a month to paying down her credit card balance. If she pays $80 a month without any new charges, how long will it take Janice to pay down her balance?

Answer: 93.11 months

This problem can be solved using a financial calculator:

Time Value of Money	
P/Y	12
PV	$4,000
PMT	-$80
FV	$0
I/Y	18%
N=	93.11

2. Janice's sister, Jennifer, recently graduated from college and has $4,000 in ten-year student loans carrying a 5% APR. The loans require a monthly payment of $42.43, but Jennifer determines that she would like to pay down her loan more quickly and so decides to pay $80 a month. How long will it take Jennifer to pay down her balance if she pays $80 a month?

Answer: 56.18 months

This problem is the same as the last one, except the interest rate is 5%:

Time Value of Money	
P/Y	12
PV	$4,000
PMT	-$80
FV	$0
I/Y	5%
N=	56.18

Note the difference a lower interest rate has. By making the same $80 payment, Janice is able to pay down her loan in a little under six years, whereas Jennifer will take almost eight years.

3. Mr. Oldweather, a small businessman, owns and runs a gizmo manufacturing firm. To build his gizmos, he purchases gears from a regular supplier. Each box of gears costs $2,000 and the supplier allows Mr. Oldweather to pay for a box in four quarterly installments of $500. But to encourage Mr. Oldweather to pay up-front, the supplier offers him a $200 discount per box if he pays today. Mr. Oldweather read in a small business article that it's good for cash flow to delay payment to your suppliers and so he never takes the discount and instead always pays in installments. Effectively, Mr. Oldweather is buying gears on credit with a short-term loan – what is the implicit APR he pays?

Answer: 17.41% APR

This treated as a loan where Mr. Oldweather "borrows" the $1,800 cost of the gears today and repays the "loan" in four quarterly $500 installments:

Time Value of Money	
P/Y	4
PV	$1,800
PMT	-$500
FV	$0
N	4
I/Y=	17.41%

Note that the payments are quarterly, so the periods per year should be changed to *four* for this problem. To do so with a *TI BA II Plus*, enter the following keystrokes:

To	Press	Display
Set payments per year to 4.	[2nd], [P/Y], 4, [Enter]	P/Y = 4.00
Return to standard-calculator mode	[2nd], [Quit]	0.00

4. Larry borrows $600 for two weeks from a local payday lender. His fee for borrowing the $600 for two weeks is $108, which is due in two weeks along with the original $600. What is the APR on this payday loan? How much would Larry pay in fees if he rolled over the loan every two weeks for a year by paying only the $108 every two weeks?

Answer: Given that there are 52 weeks in a year, the APR of the loan can be calculated as:

$$APR = \frac{\$108}{\$600} * \frac{52}{2} = 4.68 = 468\%$$

If Larry rolled the loan over by paying the $108 fee every two weeks for a year, he would make 52/2 = 26 payments of $108, for a total of $$2,808. (Note that $2,808 divided by the borrowed amount of $600 is $2,808/$600 = 4.68 = 468%. This is the APR.)

5. An online rent-to-own store offers a 47" LED flat-screen TV for 91 weekly payments of $22.99. The Rent-to-Own store lists the retail price, at which it may be purchased outright, of the TV at $1,199.99. Rent-to-own stores often overstate the retail price of their products and this same TV can be purchased directly for $749.00 from a popular online retailer. What is the implicit APR on this contract given the retail price of $1,199.99? What is the APR given a retail price of $749.00?

Answer: For a retail price of $1,199.99, the weekly APR can be found to be 70.2%:

Time Value of Money	
P/Y	52
PV	$1,199.99
FV	$0
PMT	-$22.99
N	91
I/Y=	70.2%

Using the price of $749.00, the implied weekly APR is::

Time Value of Money	
P/Y	52
PV	$749.00
FV	$0
PMT	-$22.99
N	91
I/Y=	147.0%

This corresponds to an APR of 52*2.8265% = 147%! The buyer, therefore, would be better off purchasing the TV from the online retailer if they could do so using a credit card charging less than a 147% APR…

6. A student **beginning her senior year** in college borrows $5,500 using a Perkins loan with a 5% APR. Because of the subsidized interest, interest will not accrue during her final year of school, and because of the grace period, no interest will accrue for the first year after she graduates. Interest will start accruing one year after she graduates, and she will pay down the loan in ten annual installments beginning with a payment three years from now. Compute the implicit interest rate on this loan.

Answer: This is similar to the problem in the lecture, except the student takes out the loan at the beginning of her senior year instead of her freshman year. Thus, payments are only delayed for 2 years instead of five. The monthly payments, the first of which will be due in three years, will be:

Time Value of Money	
P/Y	1
PV	$5,500
FV	$0
I/Y	5%
N	10
PMT=	-$712.28

And the implicit interest rate from delaying the interest accrual for two years is:

Cash Flow Worksheet	
CF_0	$5,500
C01	$0
F01	2
C02	-$712.28
F02	10
IRR=	3.58%

In class, we found that a student able to delay payments for five years (through four years of schooling instead of one, plus a one-year grace period) was 2.52%. The implied interest rate was lower in that case because, since the payments are pushed even further into the future, the financing is implicitly cheaper.