



NCCVT

## UNIT 6: LOANS & PAYMENTS STUDENT PACKET

September 2010



The questions below will help you keep track of key concepts from this lesson's study activity. Use the study page numbers listed to help you fill in the blanks or solve the problems.

Page 2

Define single payment loan.

Page 3

Define the following term: payday loan.

How does the lender in a payday loan make sure he or she doesn't lose money?

Page 4

What are some reasons people get payday loans?

Page 5

What is one way that lenders of payday loans make it difficult to compare the interest rates they charge to those charged by banks?

Page 6

What is the formula for APR?

How do you find the periodic interest rate of a payday loan?

How do you find the number of periods in a year of a payday loan?

Page 7

What is the formula for effective interest rate?

What do  $r$  and  $n$  stand for in the effective interest rate formula?

Describe the difference between a 10% weekly interest rate and 10% APR compounded weekly?

Page 9

What are the effective interest rates for these loans?

- a. Bad Loans Inc. is offering Jim a \$400 loan maturing in 2 weeks for a fee of \$120.
  
- b. Ripoff Lenders is offering Jim a \$100 loan maturing in 1 week for a fee of \$15.
  
- c. Gouge Rates Company is offering Jim a \$200 loan maturing in 10 days for a fee of \$20.

Page 10

Summarize how the effective interest rate of a typical payday loan compares to usual sources of loans.



Answer the following questions using what you've learned from this lesson. Write your responses in the space provided.

1. Patty took out a payday loan for \$700 due in 2 weeks that charged a \$140 fee. What is the periodic interest rate of the loan?
2. What is the APR of a payday loan for \$1825 due in 18 days that charges a \$135 fee?
3. If a 12-day single payment loan has a periodic interest rate of 11.2%, what is the approximate APR of the loan?
4. Tamara has the option of borrowing \$990 for two weeks at an APR of 300% or borrowing the \$990 for two weeks with a fee of \$115. Which is the "better" deal?

The following partially completed table shows information for four different payday loans. Fill in the missing information in the table. Use the example as a guide.

	Amount borrowed	Fee	Periodic interest rate	Time until loan matures	Periods per year	APR
Example	\$800	\$120	15%	4 weeks	13	195%
5.	\$1400	\$140		2 weeks		
6.	\$900		5%	5 days		
7.		\$200	8%			416%

8. Perry took out a payday loan for \$1350 that charged a \$55 fee. If the loan matures in 1 week, what is the approximate effective interest rate of the loan?
9. List three reasons why a person might choose to get a payday loan.
10. Wanda took out a payday loan with an effective interest rate of 19,300%. If she had \$460 to invest for a year at this interest rate, how much would she make in interest? Is it likely that she could find an investment like this?



The questions below will help you keep track of key concepts from this lesson's study activity. Use the study page numbers listed to help you fill in the blanks or solve the problems.

Page 2

What is an installment loan?

What are some examples of things that people buy with installment loans?

Page 3

How do you compute the markup rate?

If you are paying \$4000 above the sticker price for a car, what is the markup rate?

Page 7

What is a layaway?

Describe the process of layaway.

Page 8

In your own words, what is the difference between layaways and installment loans?

Page 9

Suppose you buy a bedside table on layaway for \$345. You put down an 18% deposit.

a) How much is your deposit?

b) How much do you have left to pay?

c) If you pay \$35 a month, how many months will you need to pay for your bed?

d) How many months will it take if you pay \$55 a month?



Answer the following questions using what you've learned from this lesson. Write your responses in the space provided.

- Charlene bought a hang glider with a sticker price of \$4400. If she paid \$230 a month for 24 months, how much interest did she pay?
- Juan bought a stereo with a sticker price of \$850. If he paid \$20 a week for a year, what was the approximate markup rate on the stereo?

3 – 6. Match each of the TVM Solver screens with the problem it is trying to solve.

TVM Solver Screen	Problem
a. N=3 I%= PV=-1200 PMT=0 FV=1296 P/Y=1 C/Y=12 PMT: <input type="checkbox"/> END <input checked="" type="checkbox"/> BEGIN	i. An item with a sticker price of \$1200 can be purchased by paying \$48 a month for 36 months. What interest rate is being offered?
b. N=4 I%= PV=-1200 PMT=0 FV=2304 P/Y=1 C/Y=12 PMT: <input type="checkbox"/> END <input checked="" type="checkbox"/> BEGIN	ii. An item with a sticker price of \$1200 can be purchased by paying \$36 a month for 48 months. What interest rate is being offered?
c. N=3 I%= PV=-1200 PMT=0 FV=1728 P/Y=1 C/Y=12 PMT: <input type="checkbox"/> END <input checked="" type="checkbox"/> BEGIN	iii. An item with a sticker price of \$1200 can be purchased by paying \$36 a month for 36 months. What interest rate is being offered?
d. N=4 I%= PV=-1200 PMT=0 FV=1728 P/Y=1 C/Y=12 PMT: <input type="checkbox"/> END <input checked="" type="checkbox"/> BEGIN	iv. An item with a sticker price of \$1200 can be purchased by paying \$48 a month for 48 months. What interest rate is being offered?

- Colleen has an offer to buy a car with a sticker price of \$25,900 by paying \$460 a month for 72 months. What interest rate is Colleen being offered?
- Brett put a \$410 item on layaway by making a down payment of 16% of the purchase price. How much does he have left to pay off after making the down payment?
- Carmen put a \$270 watch on layaway by making a 12% down payment and agreeing to pay \$18 a week. How many weeks will it take Carmen to pay off the watch?
- Andre plans to buy a \$95 birthday present for his father, whose birthday is on February 26. He can afford to put it on layaway with a 10% down payment and \$15 a month after that. If payments are due at the beginning of each month, when should Andre make his first monthly payment?



The questions below will help you keep track of key concepts from this lesson's study activity. Use the study page numbers listed to help you fill in the blanks or solve the problems.

Page 1

Write the definition of amortization.

Page 2

If you pay down your principal, the amount of interest you accrue \_\_\_\_\_ .

If you pay back only the interest you owe each year, you will still owe \_\_\_\_\_ at the end of your loan.

Page 4

The interest due is:

Page 5

Imagine you take out a loan for \$2000 at 6% APR compounded monthly.

You decide that you will pay back \$100 of your \$2000 loan each month, plus the interest that accrues.

1. In month 1, you pay back \$ \_\_\_\_\_ of principal and \$ \_\_\_\_\_ of interest.

2. In month 2, you pay back \$ \_\_\_\_\_ of principal plus the interest on  $\$2000 - \$100 = \$$  \_\_\_\_\_ .

The amount of interest you pay this month is \$ \_\_\_\_\_ .

Page 6

Write the definition of each of the following terms:

Amortization table:

Note reduction:

Payment number:

Unpaid balance:

Page 7

Nick takes out a \$2000 loan for a car with 6% annual interest. His payments are \$46.97. Fill in the amortization table below and see how long it will take him to pay back the entire loan, plus interest. (The table below is in dollars.)

Fill in the table below.

Payment Number	Payment Amount	Interest Due	Note Reduction	Unpaid Balance
1	\$46.97			
2	\$46.97			
3	\$46.97			

Page 8

How can you calculate the total amount of your loan using amortization payments? Write a formula in your own words.

Page 10

Write the formula for amortization payment:

What does each of the variables stand for?

$M =$

$P =$

$r =$

$n =$

Page 12

What do each of the variables stand for in the TVM calculator?

$N =$

$I\% =$

$PV =$

$P/Y$  and  $C/Y =$

$FV =$

$PMT =$



Answer the following questions using what you've learned from this lesson. Write your responses in the space provided.

- Josiah took out a 25-year loan for \$215,000 at 9.6% interest, compounded monthly. If his monthly payment on the loan is \$1893.41, how much of his first payment went toward note reduction?
- Lillian took out a 20-year loan for \$170,000 at 8.8% interest, compounded monthly. If her monthly payment on the loan will remain \$1507.74 for the life of the loan, how much will Lillian have paid in interest once the loan is paid off?

**3 – 5.** Carson took out a 30-year loan for \$145,000 at 3.6% interest, compounded monthly, and his monthly payment for the life of the loan will be \$659.24. An amortization table for his first four payments is shown below. Fill in the missing information in the table. Use the information for the first payment as a guide.

Payment Number	Payment Amount	Interest Due	Note Reduction	Unpaid Balance
1	\$659.24	\$435.00	\$224.24	\$144,775.76
2				
3				
4				

- Fill in the blanks. For Carson's 30-year loan in the previous question, the amount of payment 5 applied to interest will be \_\_\_\_\_ than the amount of payment 4 applied to interest. Also, the amount of payment 5 applied to note reduction will be \_\_\_\_\_ than the amount of payment 4 applied to note reduction.
- The following numbers were plugged into the TVM Solver of a graphing calculator to solve for the monthly payment of a loan.
 

```
N=300
I%=6
PV=-240000
PMT=
FV=0
P/Y=12
C/Y=12
PMT:END BEGIN
```
- Angelica took out a 20-year loan for \$170,000 at 5.4% interest, compounded monthly. What is her monthly payment?
- Suppose that the interest rate on Angelica's loan in the previous question were 5.2% instead of 5.4%. Would her monthly payment have been larger or smaller than the one you calculated? Explain your reasoning.

**10.** Fernando has the choice of taking out a 25-year loan for \$150,000 at 6.6% interest, compounded monthly, or the same loan at 20 years for a higher monthly payment. How much more is the monthly payment for the 20-year loan than the monthly payment for the 25-year loan?



The questions below will help you keep track of key concepts from this lesson's study activity. Use the study page numbers listed to help you fill in the blanks or solve the problems.

Page 1

$$M = \frac{Pr(1+r)^n}{(1+r)^n - 1}$$

In the amortization formula,  
what are the following variables?

$M$  is \_\_\_\_\_ ;

$P$  is \_\_\_\_\_ ;

$r$  is \_\_\_\_\_ ;

$n$  is \_\_\_\_\_ .

How do you get from APR to the monthly interest rate?

Page 3

Write down the steps for rearranging the amortization formula  $M = \frac{Pr(1+r)^n}{(1+r)^n - 1}$  into the formula to solve for the maximum principle.

Page 4

You can afford a \$250-per-month car payment. Which is the most expensive car can you afford at an APR of 6% for 4 years?

$M$  is monthly payment: \_\_\_\_\_ .

$r$  is the monthly interest rate. Enter the decimal value: \_\_\_\_\_ .

$n$  is the number of months you will make payments: \_\_\_\_\_ .

Calculate  $P$ .

Page 6

What is the effect on your loan as  $r$ , the interest rate, goes higher?

What is the effect on your loan as  $n$ , the length of the loan, goes up?

What is the effect on the loan as  $M$ , the amount you can pay per month, goes up?

Page 7

Which variable are you solving for on the TVM Solver when you want to find the maximum loan amount?

Write a sentence to explain why the monthly payment is negative.

Page 8

Suppose that your monthly payment is \$350 at a 4.8% APR, compounded monthly over 36 months. How much are you able to borrow? Try this on your own and round your answer to the nearest cent.

PV = This is what we are trying to find, so leave it blank.

PMT = -350 This is the monthly payment. It is entered as a negative since we are paying it out.

FV = 0 This is set to zero because eventually, you will pay off this loan to zero.

P/Y = 12 This is payments per year. It is entered as 12 since there are 12 monthly payments in a year.

C/Y = 12 Compounding periods per year. There are 12 since you are compounding monthly.

PMT: END This tells when you make a payment. Always set PMT to END.

Page 9

Dana makes \$69,100 per year. The APR for Dana is 5.7%, compounded monthly. The loan will last 25 years.

How much can Dana borrow to buy a house? Round your answer to the nearest cent. \$ \_\_\_\_\_

Page 10

Practice preapproving someone for a house loan. For an example, imagine Fred makes \$52,000 per year. The APR available to Fred is 6% for a loan that lasts 30 years. Enter the values to plug into the formula.

$$P = \frac{M((1+r)^n - 1)}{r(1+r)^n}$$

$M =$  \_\_\_\_\_ .

$P$  is the principal or initial amount of loan. This is what you are trying to find.

$r =$  \_\_\_\_\_ .

$n =$  \_\_\_\_\_ .

Use the max loan payment to calculate how much you will preapprove Fred for. Write out your work.



Answer the following questions using what you've learned from this lesson. Write your responses in the space provided.

For each of the following three questions, an expression is given. For each expression, fill in the blanks of the problem it is being used to solve. Then solve the problem.

1. 
$$\frac{(\$950)((1+0.003)^{360} - 1)}{(0.003)(1+0.003)^{360}}$$

Stacy can afford a \$ \_\_\_\_\_ -  
per-month house loan payment. If  
she is being offered a  
\_\_\_\_\_ -year house loan with  
an APR of \_\_\_\_\_ %,   
compounded monthly, what is the  
most money she can borrow?  
The most money Stacy can borrow  
is \$ \_\_\_\_\_ .

2. 
$$\frac{(\$1020)((1+0.012)^{300} - 1)}{(0.012)(1+0.012)^{300}}$$

Octavio can afford a \$ \_\_\_\_\_ -per-  
month house loan payment. If he is being  
offered a \_\_\_\_\_ -year house loan  
with an APR of \_\_\_\_\_ %,   
compounded monthly, what is the most  
money he can borrow?  
The most money Octavio can borrow is  
\$ \_\_\_\_\_ .

3. 
$$\frac{(\$1540)((1+0.005)^{240} - 1)}{(0.005)(1+0.005)^{240}}$$

Liliana can afford a \$ \_\_\_\_\_ -  
per-month house loan payment. If  
she is being offered a \_\_\_\_\_  
-year house loan with an APR of  
\_\_\_\_\_ %, compounded  
monthly, what is the most money she  
can borrow?  
The most money Liliana can borrow  
is \$ \_\_\_\_\_ .

4. Lou can afford a \$92-per-month loan  
payment. If he is being offered a 3-year  
loan with an APR of 21.6%,  
compounded monthly, what is the most  
money Lou can afford to borrow?

For each of the following three questions, a TVM Solver screen is given. For each TVM Solver screen, fill in the blanks of the problem it is being used to solve. Then solve the problem.

5.  $N=48$   
 $I\%=13.8$   
 $PV=$   
 $PMT=-330$   
 $FV=0$   
 $P/Y=12$   
 $C/Y=12$   
 $PMT: [END] BEGIN$

Andres can afford a \$ \_\_\_\_\_ -per-month car payment. If he is being offered a \_\_\_\_\_ -year car loan with an APR of \_\_\_\_\_ %, compounded monthly, what is the value of the most expensive car he can afford?  
 The value of the most expensive car Andres can afford is \$ \_\_\_\_\_ .

6.  $N=60$   
 $I\%=10.2$   
 $PV=$   
 $PMT=-195$   
 $FV=0$   
 $P/Y=12$   
 $C/Y=12$   
 $PMT: [END] BEGIN$

Liz can afford a \$ \_\_\_\_\_ -per-month car payment. If she is being offered a \_\_\_\_\_ -year car loan with an APR of \_\_\_\_\_ %, compounded monthly, what is the value of the most expensive car she can afford?  
 The value of the most expensive car Liz can afford is \$ \_\_\_\_\_ .

7.  $N=60$   
 $I\%=10.2$   
 $PV=$   
 $PMT=-195$   
 $FV=0$   
 $P/Y=12$   
 $C/Y=12$   
 $PMT: [END] BEGIN$

Isaac can afford a \$ \_\_\_\_\_ -per-month car payment. If he is being offered a \_\_\_\_\_ -year car loan with an APR of \_\_\_\_\_ %, compounded monthly, what is the value of the most expensive car he can afford?  
 The value of the most expensive car Isaac can afford is \$ \_\_\_\_\_ .

8. Put the following three loans in order from smallest loan to largest loan.
- A 22-year loan with monthly payments of \$330 at an APR of 7.5%, compounded monthly.
  - A 22-year loan with monthly payments of \$330 at an APR of 8.2%, compounded monthly.
  - A 22-year loan with monthly payments of \$330 at an APR of 6.8%, compounded monthly.

9. Put the following three loans in order from smallest loan to largest loan.
- A 12-year loan with monthly payments of \$460 at an APR of 10.4%, compounded monthly.
  - A 15-year loan with monthly payments of \$460 at an APR of 10.4%, compounded monthly.
  - A 9-year loan with monthly payments of \$460 at an APR of 10.4%, compounded monthly.

10. Put the following three loans in order from smallest loan to largest loan.
- A 27-year loan with monthly payments of \$920 at an APR of 7.1%, compounded monthly.
  - A 27-year loan with monthly payments of \$870 at an APR of 7.1%, compounded monthly.
  - A 27-year loan with monthly payments of \$760 at an APR of 7.1%, compounded monthly.



The questions below will help you keep track of key concepts from this lesson's study activity. Use the study page numbers listed to help you fill in the blanks or solve the problems.

Page 2

Write the definition of deferred payment:

What are three types of deferred payment?

Page 3

Give one example of no payments and one of no interest.

Page 4

Stan's Autos offers 0% financing for 10 months on a car that costs \$12,000. The APR on the loan after 10 months will be 2.5%. If Ben's loan is to be paid off in 5 years, how much will the car cost him? How does this compare to an offer without the 10-month 0% financing?

Assume interest is compounded monthly and the dealer tells Ben he will be making monthly payments of \$208.92 for 5 years.

Page 6

Suppose Ben from the previous example heads to Highway Auto, where they offer no payments for 10 months on the same car for \$12,000. The APR there is still 2.5%, and the loan is still for 5 years.

What is the monthly payment and the total cost in this case?

Page 7

What if Ben finds an offer for 0% APR and no payments for the first 10 months with the same APR of 2.5% and loan length of 5 years? Well, in this case, all that is happening is you are shortening the length of the loan from 5 years, or 60 months, to 50 months.

Page 9

What is the main benefit of a student loan?

Page 10

What are student loans?

What are unsubsidized loans?

Subsidized loans?

What type of deferred payment are unsubsidized loans?

What type of deferred payment are subsidized loans?



Answer the following questions using what you've learned from this lesson. Write your responses in the space provided.

Alexander took out a 4-year car loan for \$13,800 to be paid back with monthly payments at a 15.6% APR, compounded monthly. The loan offers no payments for the first 14 months. Use this information to answer the following 5 questions.

1. What is the periodic interest rate of the car loan?
2. What is the total amount that Alexander will owe when he starts making payments?
3. What will Alexander's monthly payment be after 14 months?
4. What is the total amount that Alexander will pay for the car loan?
5. How much will Alexander pay in interest for the car loan?

Abigail took out an unsubsidized student loan of \$42,000 at a 3.6% APR, compounded monthly, to pay for her last six semesters of college. She will begin paying off the loan in 33 months with monthly payments lasting for 15 years. Use this information to answer the following 5 questions.

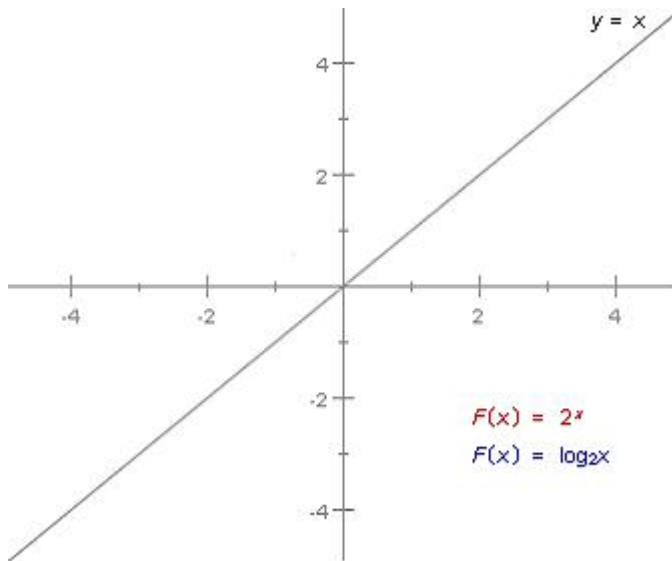
6. What is the periodic interest rate of the student loan?
7. What is the total amount that Abigail will owe when she starts making payments?
8. What will Abigail's monthly payment be after 33 months?
9. What is the total amount that Abigail will pay for the student loan?
10. How much will Abigail pay in interest for the student loan?



The questions below will help you keep track of key concepts from this lesson's study activity. Use the study page numbers listed to help you fill in the blanks or solve the problems.

Page 2

Sketch the graph of a logarithmic function and the corresponding exponential function.



Page 4

Write the three properties of logarithmic functions.

Page 5

What is the monthly payment formula?

Show how to rewrite the formula as  $(1+r)^n = \frac{M}{M - Pr}$ .

How do you use the logarithm function to solve for  $n$  in the formula  $(1+r)^n = \frac{M}{M-Pr}$  ?

What is the final time-to-pay-off formula?

Page 6

The price of the TV was \$1999 and you paid \$15 a month. Suppose the interest rate was 6% APR, compounded monthly. How many payments would you need to make?

Page 7

Suppose you take out a \$250,000 loan with 6.5% interest, and you pay \$1580.17 per month. How would you use the TVM Solver on your calculator to find the number of payments?

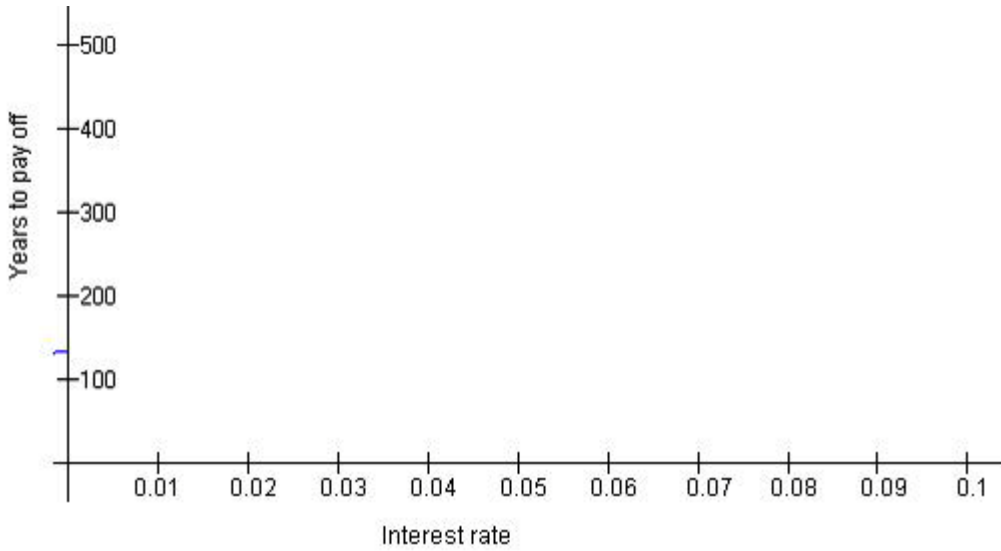
Use the TVM Solver to figure out the number of payments you need to make on a \$150,000 loan with 7.9% interest that you pay \$1099 a month on?

Page 9

Fill out the following chart with information for purchasing the \$1999 TV for just \$15 a month.

Interest Rate	Number of Payments
2%	
5%	
5.5%	
6%	
7.5%	
8.5%	

Draw the graph that relates interest to the number of payments.



Try to think of a reason why it seems that at around 0.09 or 9%, the number of years goes to infinity.

Page 10

As before, the television costs \$1999 and is advertised with a \$15 monthly payment and with 6% interest. Fill in the following table for different monthly payments.

Monthly payment	$n$
\$15	220
\$20	
\$30	
\$40	
\$50	

Describe why it seems that if the size of the payment gets too small, then the time to pay off is infinity.

Describe why, as the size of the payment gets larger, the time to pay off gets smaller. At what point is the time to pay off exactly 1 month?



Answer the following questions using what you've learned from this lesson. Write your responses in the space provided.

1 – 3. Match each expression in column A with an equivalent expression in column B.

Column A	Column B
a. $\log(17 \cdot 2)$	i. $\log(17) - \log(2)$
b. $\log\left(\frac{17}{2}\right)$	ii. $17 \cdot \log(2)$
c. $\log(2^{17})$	iii. $\log(17) + \log(2)$

For each of the following three questions, an expression is given. For each expression, fill in the blanks of the problem it is being used to solve. Then solve the problem. Be sure to round up your answer to the nearest whole number.

$$4. \frac{\log\left(\frac{114.5}{114.5 - (1925)(0.013)}\right)}{\log(1 + 0.013)}$$

Delaney took out a loan for \$ \_\_\_\_\_ at a(n) \_\_\_\_\_ % APR, compounded monthly. If she will make monthly payments of \$ \_\_\_\_\_ to pay off the loan, what is the number of payments she will have to make?  
\_\_\_\_\_ payments

$$5. \frac{\log\left(\frac{280.9}{280.9 - (9910)(0.01)}\right)}{\log(1 + 0.01)}$$

Jorge took out a loan for \$ \_\_\_\_\_ at a(n) \_\_\_\_\_ % APR, compounded monthly. If he will make monthly payments of \$ \_\_\_\_\_ to pay off the loan, what is the number of payments he will have to make?  
\_\_\_\_\_ payments

$$6. \frac{\log\left(\frac{24.2}{24.2 - (777)(0.008)}\right)}{\log(1 + 0.008)}$$

Karen took out a loan for \$ \_\_\_\_\_ at a(n) \_\_\_\_\_ % APR, compounded monthly. If she will make monthly payments of \$ \_\_\_\_\_ to pay off the loan, what is the number of payments she will have to make?  
\_\_\_\_\_ payments

For each of the following three questions, a TVM Solver screen is given. For each TVM Solver screen, fill in the blanks of the problem it is being used to solve. Then solve the problem. Be sure to round up your answer to the nearest whole number.

7. `N=`  
`I%=3.6`  
`PV=10300`  
`PMT=-390.7`  
`FV=0`  
`P/Y=12`  
`C/Y=12`  
`PMT: [END] BEGIN`

Shane took out a loan for

\$ \_\_\_\_\_ at a(n) \_\_\_\_\_  
 \_\_\_\_\_ % APR, compounded  
 monthly. If he will make monthly  
 payments of \$ \_\_\_\_\_ to pay  
 off the loan, what is the number of  
 payments he will have to make?  
 \_\_\_\_\_ payments

8. `N=`  
`I%=18`  
`PV=1790`  
`PMT=-99.1`  
`FV=0`  
`P/Y=12`  
`C/Y=12`  
`PMT: [END] BEGIN`

Autumn took out a loan for

\$ \_\_\_\_\_ at a(n) \_\_\_\_\_ %  
 APR, compounded monthly. If she will  
 make monthly payments of  
 \$ \_\_\_\_\_ to pay off the loan, what  
 is the number of payments she will have to  
 make?  
 \_\_\_\_\_ payments

9. `N=`  
`I%=7.2`  
`PV=5585`  
`PMT=-208.3`  
`FV=0`  
`P/Y=12`  
`C/Y=12`  
`PMT: [END] BEGIN`

Cody took out a loan for

\$ \_\_\_\_\_ at a(n) \_\_\_\_\_  
 \_\_\_\_\_ % APR, compounded monthly. If he  
 will make monthly payments of  
 \$ \_\_\_\_\_ to pay off the loan,  
 what is the number of payments he  
 will have to make?  
 \_\_\_\_\_ payments

10. Giselle just took out a loan for \$480 at a  
 19.2% APR, compounded monthly, to  
 buy a new entertainment system, and she  
 has agreed to make monthly payments of  
 \$16.25 to pay off the loan. If she changes  
 her monthly payment to \$31.00, how  
 much faster would she be able to pay off  
 the loan?



The questions below will help you keep track of key concepts from this lesson's study activity. Use the study page numbers listed to help you fill in the blanks or solve the problems.

Page 1

What is prepayment?

Page 2

Suppose you took out a \$120,000 loan to go to med school. Your loan has a 6.9% APR to be paid in 30 years. You make monthly payments of \$790.32 — to date, you have made 180 payments.

What is the total amount you have left to pay if you simply make payments for the next 180 months?

If you were to pay off the remaining balance in one payment now, how much would you save?

Page 3

What is the prepayment formula?

What does each of the variables stand for?

You originally borrowed \$120,000 at an annual interest rate of 6.9% to be paid in 30 years for med school. Your monthly payment is \$790.32.

Use the formula to find out how much you would have left to pay if you prepaid off your loan after 15 years.

Page 5

What function on a graphing calculator allows you to solve for the prepayment amount?

Page 7

How can you find out how much you would pay for a loan without prepayment?

How can you find out how much you would pay for a loan with prepayment?

Suppose Kevin borrows \$40,000 for law school with an APR of 7.1%, compounded monthly. He makes monthly payments of \$328.54.

The loan is to be paid in 18 years, but after making 15 years of payments, Kevin inherits some money and decides to pay off his loan ahead of time. How much will he save by prepaying off his loan?

Page 9

Which type of loans should you generally pay off first: loans with high interest or high-principal loans?

Page 10

What is a prepayment fee?

Page 11

What is a typical prepayment fee?

Write the steps to calculate the prepayment fee.



Answer the following questions using what you've learned from this lesson. Write your responses in the space provided.

For each of the following three questions, an expression is given. For each expression, fill in the blanks of the problem it is being used to solve. Then solve the problem.

1.  $\$180,000(1+0.0095)^n$

$$+\$1614.66$$

$$\left[ \frac{1 - (1 + 0.0095)^n}{0.0095} \right]$$

Betsy took out a 25-year house loan for \$ \_\_\_\_\_ at an APR of \_\_\_\_\_ %, compounded monthly, and she is making monthly payments of \$ \_\_\_\_\_. What will her balance be with \_\_\_\_\_ years left on the loan? Betsy's balance will be \$ \_\_\_\_\_.

2.  $\$85,000(1+0.0055)^n$

$$+\$542.86$$

$$\left[ \frac{1 - (1 + 0.0055)^n}{0.0055} \right]$$

Ronald took out a 30-year house loan for \$ \_\_\_\_\_ at an APR of \_\_\_\_\_ %, compounded monthly, and he is making monthly payments of \$ \_\_\_\_\_. What will his balance be with \_\_\_\_\_ years left on the loan? Ronald's balance will be \$ \_\_\_\_\_.

3.  $\$105,000(1+0.0105)^n$

$$+\$1200.36$$

$$\left[ \frac{1 - (1 + 0.0105)^n}{0.0105} \right]$$

Hillary took out a 20-year house loan for \$ \_\_\_\_\_ at an APR of \_\_\_\_\_ %, compounded monthly, and she is making monthly payments of \$ \_\_\_\_\_. What will her balance be with \_\_\_\_\_ years left on the loan? Hillary's balance will be \$ \_\_\_\_\_.

For each of the following three questions, two TVM Solver screens are given. For each pair of TVM Solver screens, fill in the blanks of the problem it is being used to solve. Then solve the problem.

4. 

<pre>N=132 I%=8.2 PV=38888 PMT=-437.88944 FV=0 P/Y=12 C/Y=12 PMT:BEGIN</pre>	bal(60)
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Boyce took out a(n) \_\_\_\_\_-year loan for \$ \_\_\_\_\_ at an APR of \_\_\_\_\_ %, compounded monthly. What will his balance be after \_\_\_\_\_ years? Boyce's balance will be \$ \_\_\_\_\_.

5. 

<pre>N=204 I%=10.3 PV=59888 PMT=-613.76566 FV=0 P/Y=12 C/Y=12 PMT:BEGIN</pre>	bal(36)
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Carol took out a(n) \_\_\_\_\_-year loan for \$ \_\_\_\_\_ at an APR of \_\_\_\_\_ %, compounded monthly. What will her balance be after \_\_\_\_\_ years? Carol's balance will be \$ \_\_\_\_\_.

6. 

<pre>N=188 I%=9.5 PV=43888 PMT=-593.88251 FV=0 P/Y=12 C/Y=12 PMT:BEGIN</pre>	bal(84)
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Vince took out a(n) \_\_\_\_\_-year loan for \$ \_\_\_\_\_ at an APR of \_\_\_\_\_ %, compounded monthly. What will his balance be after \_\_\_\_\_ years? Vince's balance will be \$ \_\_\_\_\_.

Norah took out a 20-year loan for \$87,000 at an APR of 7.8%, compounded monthly. Answer the following four questions about her loan.

7. How much in total will Norah have paid after 13 years?

8. What will be the remaining balance on Norah's loan after 13 years?

9. What will be the total cost of Norah's loan if she pays it off 7 years early?

10. How much will Norah have saved by paying off the loan 7 years early?



1. What term is used to name a type of loan in which the loan amount and interest are due in one payment at maturity?
2. Rosalinda got a payday loan for \$2000, due in 2 weeks, and she paid a \$150 fee. What is the APR on Rosalinda's loan?
3. Bobby took out a single loan for \$500 and paid a \$50 fee. His loan is due in 1 week. Find the effective interest rate on the loan Bobby took out. Round the answer to one decimal place.
4. What term is used to describe a type of purchasing arrangement where a seller holds an item for the buyer and allows the buyer to pay it off in a series of payments?
5. Suppose you buy a \$1999 LCD TV on layaway. If you pay 5% down and make \$50 payments every week, how many weeks will it be before you pay off the TV?
6. A Rent-a-Furniture Center is offering a living room set that retails for \$799 for \$25 per week for 1 year. What is the percent markup on this furniture set?
7. A car that retails for \$14,999 has a sticker on the windshield that says, "\$429/mo for 48 months." What interest rate is this car financed at?

- 8.** What term is used to describe a systematic repayment of a loan through a set number of payments at a specific interest rate?
- 9.** Suppose you take out a car loan for \$9999 for 4 years at a 7.5% interest rate. What is your monthly payment?
- 10.** Sheila bought a new computer for \$2000 and has agreed to finance it at 12% interest, with \$100 payments each month. When she makes her first payment next month, how much will she pay for interest alone?
- 11.** Tiana can afford \$150 per month for a car payment. Her bank preapproved her for a 6% interest rate for 5 years. What is the maximum price of a car Tiana can afford?
- 12.** John and Kathy are shopping for their first home. Between the two of them, they feel they can afford a \$1400 monthly house payment. The bank has already preapproved them for a 30-year loan with 5.4% interest. What is the maximum house price John and Kathy can afford?
- 13.** Marco took out an unsubsidized student loan for \$20,000, which he will start paying in 4 years, after he graduates. If the interest rate is 4.2%, what is the amount he will owe once he graduates?
- 14.** Leo decides to buy a car for \$9600 with a 5-year finance plan that offers 0% financing for the first year. The APR after that will be 3.9%. Interest is compounded monthly. How much will his monthly payment be if he makes payments of \$150 per month during the first year?  
To find the amount interest will be applied to  $\$9,600 - (12 \cdot \$150) = \$7,800$

**15.** A type of student loan that offers no payments and no interest until graduation is called:

**16.** Cristina financed a \$799 laptop with a 7.2% interest rate on a 2-year loan. If she can afford to make a \$75 payment, how quickly can she pay off her laptop?

**17.** What expression is equivalent to  $\log(200) - \log(2)$ ? Calculate the answer.

**18.** What is the term used for unscheduled full or partial payment of the principal amount outstanding on a loan before its due date?

**19.** Jose has decided to pay off his \$20,000 car loan. He has been making payments of \$444.89 and has 15 months left to pay. His loan has a 12% interest rate. How much will he need to make his payment to fully pay off the car?

**20.** Jesse took out a \$14,000 car loan for 5 years at a 7.2% interest rate. Find Jesse's total payment amount for this loan.