



NCCVT

UNIT 4: CHECKING AND SAVINGS

March 2011



Name: _____

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

a. What is the definition of principal?

b. Interest?

c. Interest rate?

Page 3

What is simple interest?

Page 4

a. Write the formula for simple interest.

b. If \$1000 is invested for 2 years with a 3% yearly interest rate, the amount of simple interest earned is _____.

Page 5

a. What is period?

b. Fill in the table below.

	Monthly	Quarterly	Semiannually	Annually
Definition	Once a month	Every 3 months	Every 6 months	Once a year
Period	1 month	3 months	6 months	12 months
# of periods per year				

Page 6

a. Write down the formula for calculating the periodic interest rate.

b. If the annual interest rate is 12% and interest is calculated annually. What if interest is calculated monthly?

Page 7

Suppose you have \$45 to invest in a CD that pays simple interest calculated semi-annually. The annual interest rate is 6%. How much interest will you earn after 2 years?

Page 9

Explain the concept of the time value of money.

Page 10

a. Write the definition of the following:

- Present value

- Future value

b. What is the formula for calculating future value for simple interest?

Page 11

What is the future value of a savings account that earns 12% interest each year calculated monthly after 5 years that initially has \$325?



Name: _____

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

The table below gives information for three different CDs. Using the example as a guide, fill in the missing information in the table.

	Simple Interest Rate	Frequency of Simple Interest Calculation	Number of Periods per Year	Periodic Interest Rate	Number of Years	Total Number of Periods
Example	3.5%	Annually	1	3.5%	5	5
1. CD A	4.4%	Quarterly			12	
2. CD B			12	0.6%		96
3. CD C	5.6%		2			30

The table below gives information for deposits that will earn simple interest for a certain number of periods in three different savings accounts. Using the example as a guide, fill in the missing information in the table.

	Principal	Periodic Interest Rate	Number of Periods	Interest Earned	Future Value of Principal
Example	\$8000	0.4%	60	\$1920	\$9920
4. Deposit A	\$6000	2.4%	14		
5. Deposit B		1.3%	16	\$1872	
6. Deposit C	\$7000	0.5%	72		

7. Bianca deposited \$1500 into a savings account for which simple interest is calculated quarterly. If her \$1500 grew to \$1509 after 3 months, what is the yearly interest rate on Bianca's account?
8. Lorraine gave her friend an interest-free loan of \$1500, which her friend paid back in 18 months. Lorraine could have put the money in a savings account for those 18 months, which had a periodic simple interest rate of 2.7% calculated semi-annually. Therefore, Lorraine "lost" how much money?
9. After 2 years, Lauren earned \$170 in simple interest from a CD into which she initially deposited \$5000. What was the annual interest rate of the CD?
10. Verne deposited \$5000 into a savings account that earns 4.5% simple interest each year calculated semi-annually. What is the future value of Gerhard's account after 12 years?



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

a. What is exponential growth?

b. Double the amount of pennies you have each day, starting with 2. Write the amounts in the diagram below.



Page 2

a. What is an exponential function?

b. Fill in the table below.

x	$f(x) = 2^x$
1	
2	
3	
4	
5	

Page 4

Imagine a currency which is losing value due to inflation each year. If the currency loses 2% each year then this is an example of exponential decay. Consider this table of values for \$100. Fill in the table below.

Page 6

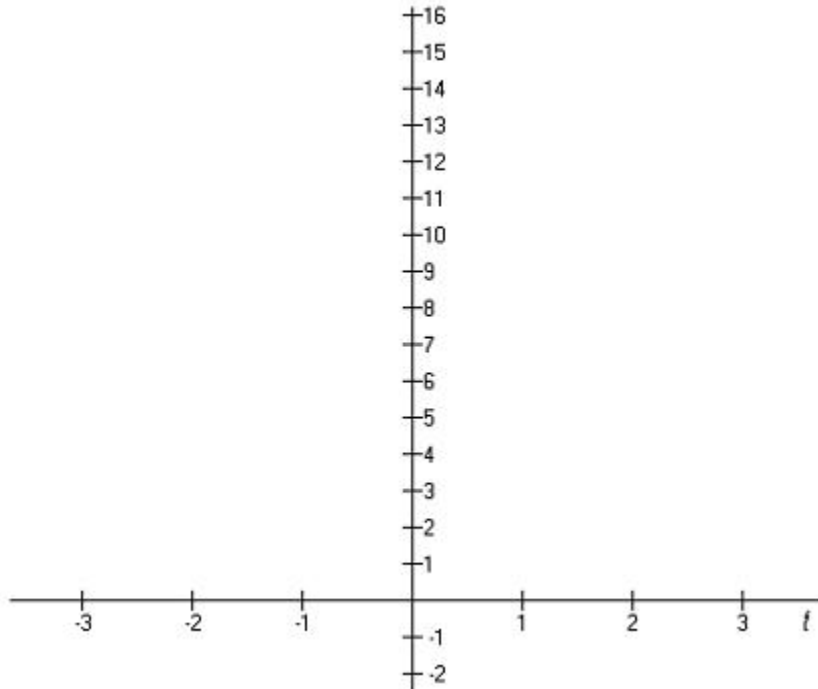
a. Is e a function or a number?

Year	Value
0	\$100
1	
2	
3	
4	

b. What is the numerical value of e to five decimal places?

Page 8

Sketch a graph of $f(t) = e^t$.



Page 9

$$\left(1 + \frac{1}{n}\right)^n$$

Let $P = 1000$, $r = 0.05$, and $n = 12$. What is $f(4)$? Round your answer to two decimal places.

Page 10

Do you think as n gets larger and larger that

$$f(t) = 1000 \left(1 + \frac{0.05}{12}\right)^{12 \cdot t} \rightarrow f(4) = 1000 \left(1 + \frac{0.05}{12}\right)^{12 \cdot 4} \approx 1220.90$$

to e ?

will continue to get closer and closer

Page 12

State the result formally that you discovered on page 10.



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

For problems 1-3, find $f(1)$, $f(2)$, and $f(3)$ for each of the given functions. Then state whether the function is an exponential growth function or an exponential decay function.

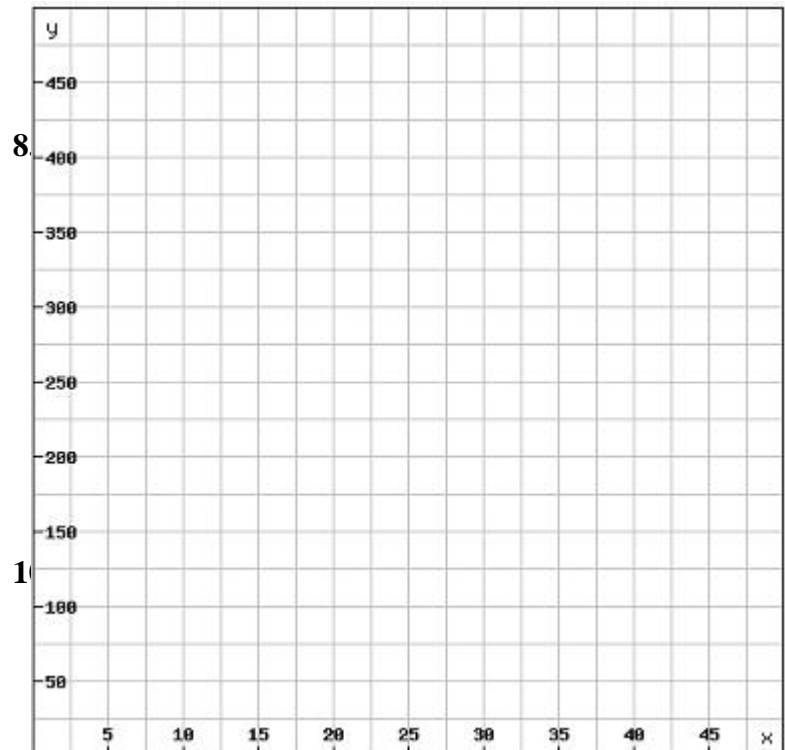
1. $f(x) = \left(\frac{1}{4}\right)(2^x)$ 2. $f(x) = (100)(0.2^x)$ 3. $f(x) = 0.1(4^x)$

4. Today an electronics store took 5% off the price of a computer, and for the next two days, it will take 5% off the previous day's price. If the price of the computer yesterday was \$2000.00, what will be the price of the computer two days from now?

5. If $f(4) = 183.07$ when $r = 0.04$ for the function $f(t) = Pe^{rt}$, then what is the approximate value of P ?

6. Graph the equation $f(x) = 0.4e^{0.1x}$
7. The world population in 1975 was approximately 4 billion, and was determined to be growing exponentially at a rate of 1.9% per year. If the formula for population growth is given as $f(x) = 4e^{0.019t}$, calculate the world population expected in 2015.

9. Benny received 4 pennies on the first day of the month, and each day after that, he received quadruple the number of pennies that he received the day before. On what day of the month did Benny first receive over 1 million dollars on a single day?





4.3.1 Study: Compound Interest

Study Sheet

Mathematics of Personal Finance (S1225613)

Name: _____

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

Define compound interest.

Page 2

a) If you invested money, would it be better to use compound interest or simple interest? Why?

b. Fill in the table below. Assume interest is 1% compounded monthly.

Period	Simple		Compound	
	Amount	Interest	Amount	Interest
1	\$100		\$100	
2				
Total interest				\$2.01

Page 3

a) What is frequency of compounding?

b) What are common compounding frequencies?

Page 5

a) What is the equation for future value using compound interest?

b) What do each of the variables stand for:

$P =$

$r =$

$n =$

c) If you invest \$5800 in a bank that gives you 13% interest compounded quarterly, how much do you have at the end of the year?

Page 6

Suppose you start with \$600 and a 10% interest rate. If you compound monthly, how much do you have at the end of the year?

Page 7

a) What do each of the following variables stand for on the calculator?

N =

I% =

PV =

FV = future value;

C/Y =

b) Suppose you are investing \$28,050 at 8% interest compounded monthly. How would you fill in the values if you wanted to see how much you would earn after 16 years?

N =

I% =

PV =

PMT =

FV =

P/Y =

C/Y =

PMT: END BEGIN

Page 11

a) Fill in the following table.

Frequency of Compounding	5 years	10 years	15 years	20 years
Annually	\$19,326.12		\$50,126.98	
Quarterly		\$32,220.77		
Monthly				
Daily				\$88,644.39

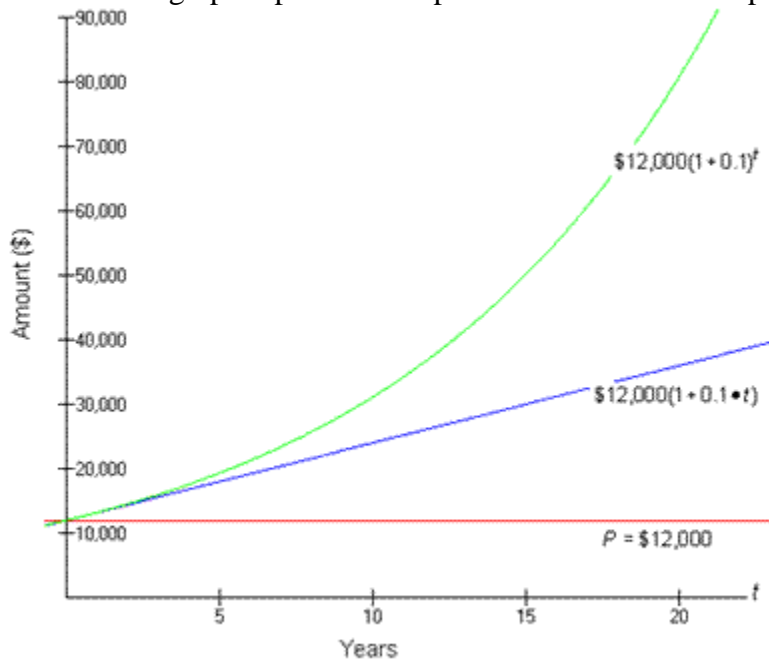
b). In your own words, what can you say about the relationship between frequency of compounding and money earned?

c) In your own words, what is the relationship between the length of the investment and money earned?

d) Compare simple interest to compound interest results for 20 years. What do you conclude?

Page 12

Label which graph represents simple interest and which represents compound interest.



Page 14

What is continuous compounding?

Page 15

What is the equation for continuously compounded interest?

Page 16

a) Suppose you take \$5800 and invest it with an 8% interest rate for 16 years compounded continuously. How much money will you have? Use your calculator, and write your answer below.

b) Suppose you invest \$14,500 some place with continuous compounding at a 6.5% interest rate for 10 years. How much money will you have? Use your calculator, and write your answer below.

c. Suppose you have \$3800 that you invest at a 5% interest rate compounded continuously for 35 years. How much money will you have? Use your calculator, and write your answer below.

Page 17

a) When you solve a continuously compounded interest problem on your calculator, what do you fill in for "C/Y"?

b) If you can invest money at a rate of 8.5% compounded continuously, and you want to have \$34,000 at the end of 15 years, how much do you need to invest initially? Fill out the calculator below:



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

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

TVM Solver Screen	Problem
a. N=2 I%=4 PV= PMT=0 FV=5190 P/Y=1 C/Y=12 PMT: <input type="checkbox"/> END <input checked="" type="checkbox"/> BEGIN	i. If \$5190 is invested in a savings account for which interest is compounded quarterly, and if the \$5190 turns into \$5910 in 2 years, what is the interest rate of the savings account?
b. N=4 I%= PV=-5190 PMT=0 FV=5910 P/Y=1 C/Y=2 PMT: <input type="checkbox"/> END <input checked="" type="checkbox"/> BEGIN	ii. How much money has to be invested at 2% interest compounded monthly to have \$5190 after 4 years?
c. N=4 I%=2 PV=-5190 PMT=0 FV= P/Y=1 C/Y=12 PMT: <input type="checkbox"/> END <input checked="" type="checkbox"/> BEGIN	iii. If \$5190 is invested at 4% interest compounded monthly, how much will the investment be worth in 2 years?
d. N=2 I%= PV=-5190 PMT=0 FV=5910 P/Y=1 C/Y=4 PMT: <input type="checkbox"/> END <input checked="" type="checkbox"/> BEGIN	iv. If \$5190 is invested in a savings account for which interest is compounded semiannually, and if the \$5190 turns into \$5910 in 4 years, what is the interest rate of the savings account?
e. N=2 I%=4 PV=-5190 PMT=0 FV= P/Y=1 C/Y=12 PMT: <input type="checkbox"/> END <input checked="" type="checkbox"/> BEGIN	v. How much money has to be invested at 4% interest compounded monthly to have \$5190 after 2 years?
f. N=4 I%=2 PV= PMT=0 FV=5190 P/Y=1 C/Y=12 PMT: <input type="checkbox"/> END <input checked="" type="checkbox"/> BEGIN	vi. If \$5190 is invested at 2% interest compounded monthly, how much will the investment be worth in 4 years?

7. True or False? When calculating compound interest, the periodic interest rate is always less than the annual interest rate. Explain your reasoning.
8. If Frank invests \$11,400 at 3.7% interest compounded quarterly, how much will his investment be worth in 9 years?
9. If Pamela invests \$16,300 in a savings account for which interest is compounded monthly, and if the \$16,300 turns into \$18,800 in 3 years, what is the interest rate of her savings account? Give your answer to the nearest tenth of a percent.
10. How much money does Stewart have to invest at 2.9% interest compounded continuously to have \$28,000 after 19 years?



4.4.1 Study: The Rule of 72

Study Sheet

Mathematics of Personal Finance (S1225613)

Name: _____

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

a. What is the rule of 72?

b. Why does \$10,000 have to double 7 times to grow to over a million?

Page 2

State the rule of 72:

Page 3

Approximately how long will it take you to double your savings of \$500 if you open a CD that earns 4% interest, according to the rule of 72?

Page 4

How does the amount of principal affect the number of years the rule of 72 predicted in the example above?

Page 6

a. Suppose you had \$125,000 in savings and you put it in a bank account that earned 2% interest. How long would it take you to double this amount?

b. How long would it take you to reach \$1,000,000?

Page 8

a. The rule of 72 estimates 9 years to double your principal of \$2000. What is the future value in 9 years of \$2000 if interest is compounded continuously? Round your answer to the nearest cent.

b. How accurate do you think the rule of 72 is?

Page 10

Write down your estimate for the new rule for continuous compounding here: the rule of

_____.

Page 11

State the rule of 69 formally and when it works best.

Page 13

a. State the rule of 72 for the number of years to halve.

b. How long will it take \$75 to halve in value if there is an inflation rate of 1.5%?



4.4.2 Checkup: Practice Problems

Checkup

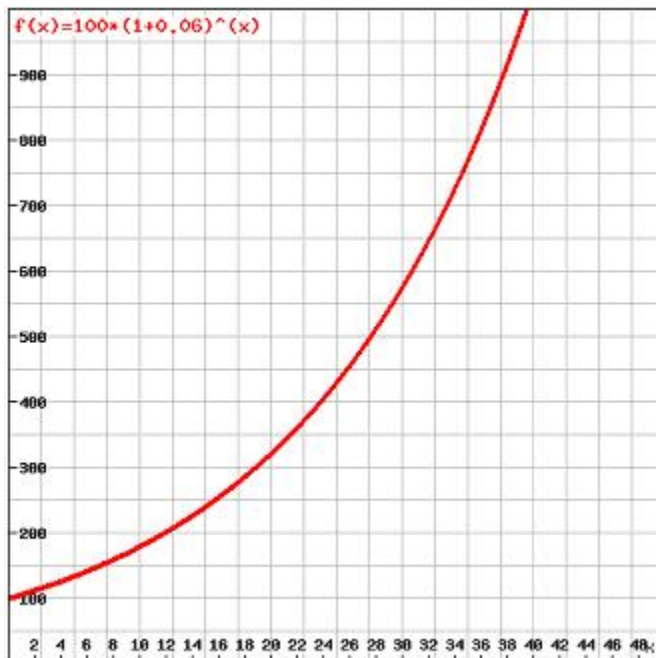
Mathematics of Personal Finance (S1225613)

Name: _____

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

	Principal	Annual Interest Rate	Frequency of Compounding	Number of Years for Principal to Double
1.	\$51,000	1.4%	Quarterly	
2.	\$46,000		Monthly	25.9
3.	\$37,000	1.9%	Continuously	
4.	\$65,000		Semiannually	18.5

The graph below shows future value of a \$100 investment earning a 6% interest rate. Based on the graph, after how many years will the money double the first time? The second time?



- Based on the same graph, in approximately how many years will the investment be worth a little over \$500?
- According to the rule of 72, in about how many years will \$74 be worth \$37 if the rate of inflation is 9.8%? Give your answer to the nearest tenth of a year.

8. According to the rule of 72, if the economy of the United Apex Emirates will double in 52 years, at about what rate per year is its GDP growing? Give your answer to the nearest tenth of a percent.

9. If \$1000 is invested in an account that earns 6.3% interest compounded continuously, how many whole years will it take for the account value to reach \$2000?

10. If Benjamin Franklin invested \$2 in 1776 into an account that has a 12% interest rate, in what year will his money reach \$128?



Name: _____

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

a. What is a checking account?

b. What are some reasons you can think of to use a checking account?

Page 2

a. What is contained in a checkbook?

b. What is a check?

c. What is a check register?

Page 3

What are some advantages of having a checking account?

Page 4

a. What is an overdraft fee?

b. What is a service fee?

Page 6

Label the following parts of the check: Account holder's name and address, check number (x2), the date, pay to the order of, dollar amount in numbers, dollar amount in words, the memo line, your signature here, routing number, account number.

ZACK MORIS
13 BAYSIDE WAY
LOS ANGELOS, CA 90001

20 _____ 11-24/121035

PAY _____ \$ _____
TO THE ORDER OF _____

DOLLARS

SEATTLE MAIN OFFICE
THE APEX BANK
20 FAKE STREET, SEATTLE WA 98101

MEMO _____ SIGNED _____

⑆121000248⑆ 123456780⑆ 0101

Page 7

a. Imagine you owe \$850 this month to your landlady, Felicity Tomorrow. The date is January 1, 2010. Write the check.

ZACK MORIS
13 BAYSIDE WAY
LOS ANGELOS, CA 90001

20 _____ 11-24/121035

PAY _____ \$ _____
TO THE ORDER OF _____

DOLLARS

SEATTLE MAIN OFFICE
THE APEX BANK
20 FAKE STREET, SEATTLE WA 98101

MEMO _____ SIGNED _____

⑆121000248⑆ 123456780⑆ 0101

b. You buy a used stereo from your friend Bill Smith. The stereo cost \$75.68. Write the check.

ZACK MORIS
13 BAYSIDE WAY
LOS ANGELOS, CA 90001

20 _____ 11-24/121035

PAY _____ \$ _____
TO THE ORDER OF _____

DOLLARS

SEATTLE MAIN OFFICE
THE APEX BANK
20 FAKE STREET, SEATTLE WA 98101

MEMO _____ SIGNED _____

⑆121000248⑆ 123456780⑆ 0101

Page 9

Fill in the register as directed.

Check Number	Date	Description of Transaction	Payment/Debit (-)	Fee	Deposit/Credit (+)	Balance

Page 10

- a. What is a blank endorsement?

- b. What is a full endorsement?

- c. What is a restrictive endorsement?

Page 11

What is a deposit slip used for?

Page 12

Suppose you are depositing one \$25 check, one \$295 check, and want \$60 in cash. How would you fill out the deposit slip below?

DEPOSIT TO THE ACCOUNT OF
NAME _____

DATE _____

903 YOUR BANK

PLEASE BE SURE EACH ITEM IS PROPERLY ENDORSED. USE OTHER SIDE TO LIST ADDITIONAL CHECKS.

DEPOSITS SUBJECT TO CORRECTION BY PROOF DEPARTMENT
ALL ITEMS CREDITED SUBJECT TO THE FINAL PAYMENT

CHECKING DEPOSIT

ACCOUNT NUMBER
* [] [1] [2] [3] [4] [5] [6] [7] [8]

9876543210

CASH

SUBTOTAL

*LESS CASH RECEIVED

\$ _____

Page 14

What are some factors to consider when choosing a checking account? Which is most important to you?

Apex Bank checking accounts pay 0.4% interest on all balances and charge the following fees:

Check fees:

For balances of \$500 or more:

No charge for checks

For balances under \$500:

\$0.025 per check

Service fees:

For balances over \$500:

No service charge

For balances \$200 to \$499.99:

Service charge of \$4/month

For balances less than \$200:

Service charge of \$6/month

Using the information given, fill out the table below

	Balance	Interest	No. of checks	Cost per check	Total cost for checks	Service charge	Total amount earned or charged	Write "Earned" or "Charged"
5.	\$650		20					
6.	\$150		16					
7.	\$400		18					

8. If Bank A charges a monthly service fee of \$2.50 and a per-check fee of \$0.15, while Bank B charges a monthly service fee of \$4 and a per-check fee of \$0.05, which bank will charge a customer more in fees if she writes 18 checks per month, and by how much?
9. Tracy has the following transactions written down and plans on entering them into her register. Her starting balance is \$178.85. She wrote checks for \$37.12, \$45.60, and got a check from her friend for \$40 she owed her. What is Tracy's current balance in the account?
10. Jeremy received a tax refund check and needs to have it deposited into his account. He decided to ask his friend JT to do that for him. What does Jeremy need to write on the back of the check to make sure that JT doesn't cash the check for himself?



4.6.1 Study: Balancing Your Checkbook
 Mathematics of Personal Finance (S1225613)

Study Sheet


Name: _____

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

a. What is a bank statement?

b. Fill in the totals below.

		FIRST BANK OF APEX				
1234 Main St. City, State				CHECKING ACCOUNT STATEMENT Page : 1 of 1		
JOHN DOE 1111 Balance St. City, State		Statement period 2010-10-09 to 2010-11-08		Account No. 123-45-678		
Date	Description	Ref.	Debits	Credits	Balance	
2010-10-08	Previous balance				.55	
2010-10-14	Payroll Deposit - HOTEL			694.81	695.36	
2010-10-14	Web Bill Payment - MASTERCARD	9685	200.00		495.36	
2010-10-16	ATM Withdrawal - INTERAC	3990	21.25		474.11	
2010-10-16	Fees - Interac		1.50			
*** Totals ***						

Page 3

a. What does reconciliation mean?

b. What are some types of transactions that must be reconciled?

Page 4

Fill in the register as directed.

Date	Description	Credit	Debit	Balance
1/30/10	Transfer from savings	250		10,000

Page 5

Reconcile Anna's register.

Date	Description	Credit	Debit	Balance
				4000.00

Page 7

Assume you and a friend add the same set of numbers but get different results: 56983 and 58983. What column would most likely contain the error?

Page 8

If two columns (i.e., groups of numbers) are supposed to add up to the same value, you can check if this is possible by using what special technique?

Page 13

a. How can you tell if you should look for a transposition error?

b. Imagine Bruce and Chris tried to add 374 and 221. Bruce got 595 and Chris got 496. Why would you expect someone made a transposition error?



Name: _____

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

Fill out the check register below with the following transactions from the month of March 2010.

- The first transaction for the month has already been entered into the register.
- A debit card purchase of \$29.99 on March 3 for an oil change for a car
- An ATM withdrawal of \$150.00 in cash on March 4
- The deposit of a rebate check of \$50.00 on March 8 for the purchase of contact lenses
- An online credit card payment of \$233.16 on March 11
- A direct deposit of \$786.58 from an employer on March 15

Date	Description	Credit	Debit	Balance
03/01/10	Interest payment	2.33		1273.06

Add the digits in column A and the digits in column B shown below, and keep adding until you get one digit for each column.

- a) What is the answer for column A?
- b) What is the answer for column B?
- c) Will the sums of two columns be equal?

Column A	Column B
55	72
16	25
136	178
37	46
203	68
9	122
67	8
22	49
98	223
193	68

7. Taylor's bank statement indicates that the balance of his checking account is \$1362, but according to Taylor's check register, the balance of his account is \$1398. Is it possible that Taylor transposed a 2-digit number in his check register? Why or why not?

8. Gina opened up a checking account with a \$50 deposit. On Friday she received her paycheck of \$432.78, which she deposited, but took out \$100 in cash as well. She later had lunch with her sister, which cost her \$24.78, and she paid for it with her debit card. After that, she went shopping and spent \$106.54, also paid with a debit card. What is the balance in Gina's account after all these transactions post?

9. Ernie wrote 10 checks last month, and these were the only transactions for his checking account. According to his check register, his balance is \$1884.88, but the bank statement he just received says his balance is \$2117.29. If nine of Ernie's 10 checks have cleared, what is the amount of the check

10. Lindsey received the following bank statement in the mail:

The beginning balance was \$1053.00. Lindsey believes she has \$756 left in her account. Find the actual balance available.

DEPOSITS

JAN 1	Deposit	\$40.00
JAN 7	Deposit	\$35.00
JAN 17	Deposit	\$10.00

PAYMENTS

JAN 5	Check 82 to Faith's Groceries	\$7.00
JAN 11	Check 83 to Brianna's Shoes Store	\$46.00
JAN 15	Check 84 to Aaron's Phone Company	\$44.00
JAN 18	Check 85 to Jack's Furniture	\$154.00
JAN 22	Check 86 to Morgan's Toys and Gifts	\$46.00
JAN 23	Check 87 to Matthew's Music	\$167.00
JAN 27	Check 88 to Andrew's Music	\$100.00

that hasn't
yet cleared?



4.7.1 Study: Comparing Checking Accounts

Study Sheet

Mathematics of Personal Finance (S1225613)

Name: _____

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

a) What is a debit card?

b) What are ATM fees?

c) What is a cost-per-check account?

Page 5

a) What is an average balance account?

b) Who would choose an average balance account?

c) Assume someone has an average balance account with a bank which costs \$35 a month but earns 5% interest. If in September (30 days) the account had \$100,000 in it until the 15th and then \$95,000 from the 15th to the 30th what is the interest earned (be sure to subtract the \$35 fee for the month)?

Page 7

Suppose you are choosing between two checking accounts. One account charges you \$1.50 ATM fee every time you withdraw money from a non-sponsored ATM and the other charges you no ATM fees and a \$15 monthly fee.

How many ATM transactions are equivalent to \$15 in monthly fees?

Page 8

A) What are the features of a typical student checking account?

a. Monthly fees:

b. Minimum balance:

c. Other perks:

b) What features would be attractive to a small business owner?

a. Transactions per month:

b. Required to maintain a minimum balance:

c. Other needs:

C) What needs does a family have?

a. What kind of checking account is most preferable?

b. Many or few regular payments:

c. Many or few checks:

d. Can qualify for free checking:

Page 9

Using what you have learned about different checking accounts, what kind of checking account would be best for each of the following people?

a. Christopher is very wealthy and likes having easy access to his cash.

b. Maria is an undergraduate at State U.

c. Julio and Clara married recently.

Page 10

a) When would it be better to have a checking account with no cost-per-check fee and a monthly fee than a checking account that is cost-per-check?

b) Suppose you are choosing between a checking account with a \$0.40 per check fee and no monthly fee or an account with free checking and a \$6.50 monthly fee. What is the minimum number of checks you need to write for the monthly fee to be a better option?



Name: _____

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

Lamar's bank statement for his checking account shows that last month, he wrote 8 checks, made 12 ATM transactions, had a minimum balance of \$1468.92, and had an average balance of \$3577.06. Assuming that this is a typical month for Lamar, choose the best checking account for him out of the three shown by calculating his total monthly fees and monthly interest earned for each account.

	Monthly Service Fee	ATM Fee	Cost-per-Check Fee	Interest
Checking account A	None with a minimum balance of \$1000.00; otherwise, \$15 per month	\$1.50 per transaction	\$0.25 per check	Simple interest of 2.4% per year on the average balance of the account
Checking account B	\$10 per month	None	\$0.75 per check	None
Checking account C	None with a minimum balance of \$1500.00; otherwise, \$20 per month	\$0.50 per transaction	None	Simple interest of 4.8% per year on the average balance of the account

	Monthly Service Fee	ATM Fee (total)	Cost-per-Check Fee (total)	Interest	Total account credit(+) or debit (-)
Checking account A					
Checking account B					
Checking account C					

4. If a bank charges \$2.75 for each ATM transaction linked to a checking account, write an equation that can be used to solve for the number of monthly ATM transactions x that is equivalent to a \$16.50 monthly service fee.
5. Checking account A charges a monthly service fee of \$30.00 and a wire transfer fee of \$4.50, while checking account B charges a monthly service fee of \$15.00 and a wire transfer fee of \$5.75. How many monthly wire transfers would cause the monthly fees for the two accounts to be equal?
6. A checking account charges a monthly service fee of \$14 and a per-check fee of \$0.60. If the total monthly fees as they relate to the number of checks written per month is graphed on a coordinate grid, with the number of checks written per month on the x -axis and the total monthly fees on the y -axis, what is the slope of the graph?
7. Kingston's checking account charges a \$13.25 monthly service fee and a \$0.35 per-check fee. If Kingston writes 9 checks per month, how much more or less would he pay in fees if he switched to a checking account that charges a \$16.50 monthly service fee and no per-check fee?
8. Suppose you are choosing between two checking accounts. Account A has a \$0.25 per-check fee, while account B charges a \$7.50 monthly fee and does not charge per-check fee. What is the maximum number of checks that will make account A be a better deal?
9. If the only fees for checking account A are a monthly service fee of \$8.00 and a per-check fee of \$0.50, while the only fees for checking account B are a monthly service fee of \$11.00 and a per-check fee of \$0.35, when will the total monthly fees for checking account B be equal to those for checking account A?

Isabel's average balance checking account pays simple interest of 3.6% annually, and she made \$1.35 in interest last month. What was Isabel's average balance last month?



4.8.1 Study: Savings Accounts

Study Sheet

Mathematics of Personal Finance (S1225613)

Name: _____

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

a) What is a bank?

b) What is a credit union?

c) How is a savings and loan institution different from a bank?

Page 2

Write the definitions of the following terms:

APR:

APY:

Page 3

a. Write the formula for APY:

b. What does n stand for? What does r stand for?

Page 4

Which offer should Jim choose — ABC Bank or XYZ bank? Show your work.

Page 8

Write what "interest calculated on an annual basis, accrued daily, and paid monthly" means.

Page 9

Assume there are 30 days in the month and the $APR = 4\%$. Since interest is calculated daily, the

period length is a day so the periodic interest rate is $\frac{0.04}{365} \approx 0.00011$.

Assume the following transactions occurred during the month:

1. For the first 15 days, your balance is \$1000.
2. On day 16 you deposit \$150.
3. On day 20 you withdraw \$200.

What is the total interest for the month if interest is calculated on an annual basis, accrued daily, and paid monthly?



4.8.2 Checkup: Practice Problems

Checkup

Mathematics of Personal Finance (S1225613)

Name: _____

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

Fill in the missing information in the table below, with all APYs rounded to two decimal places. Use the example as a guide.

	APR	Frequency with which Interest is Compounded	Number of Compounding Periods per Year	APY	Principal Invested for One Year	Total Amount of Money after Interest is Paid
Example	5.2%	Weekly	52	5.33%	\$100	\$105.33
1.	6.6%	Semiannually			\$400	
2.	2.8%		4		\$900	
3.	8.4%		12		\$700	

Savings account X, savings account Y, and savings account Z all offer APRs of 3.75%. However, savings account X compounds interest monthly, savings account Y compounds interest quarterly, and savings account Z compounds interest annually. Find the APY for the three accounts and then list the savings accounts in order of their APYs from least to greatest.

5. In January, Joanna deposited \$250 into her savings account. In February, she deposited an additional \$100. If her account has an APR of 6% compounded monthly, how much interest did Joanna earn in the first two months?
6. The APR of Bessie's savings account is 6%, and interest is compounded monthly. If the principal in Bessie's savings account was \$5600 for an entire year, what will be the balance of her account after all the interest is paid for the year?

7. The beginning balance of Otto's savings account for the month of May was \$1800, and it remained this way for the first 12 days of the month. On May 13, Otto made a withdrawal of \$400, so his balance changed, and it remained the same for a total of 8 days. On May 21, Otto made a deposit of \$1200, so his balance changed again, and it remained the same for a total of 11 days to finish out the month. If Otto's savings account has an APR of 7.3%, calculates interest daily, and pays interest at the end of the month, how much did Otto earn in interest in the month of May?
8. Willis and Charlotte both opened savings accounts with APYs of 5.45% on January 1, 2009, with Willis depositing \$3800 and Charlotte depositing \$8300. If neither Willis nor Charlotte made any additional transactions for the remainder of 2009, what was the difference in their balances after interest was paid for the year?
9. What APY would cause \$900 to turn into \$956.25 after one year?
10. Savings account A, savings account B, and savings account C all offer APYs of 4.65%. However, savings account A compounds interest monthly, savings account B compounds interest daily, and savings account C compounds interest weekly. Without calculating APRs, list the savings accounts in order of their APRs from least to greatest.



4.9.1 Study: Comparing Savings Accounts

Study Sheet

Mathematics of Personal Finance (S1225613)

Name: _____

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 definitions of the following terms:

Regular savings account:

CD:

Savings bond:

Money market account:

Page 3

a. What is liquidity?

b. What is the relationship between liquidity and interest?

Page 6

Rank the four types of savings accounts according to liquidity and interest.



Page 9

a. What is FDIC insurance?

b. What is the most money FDIC will insure in a single account?

Page 11

Fill in the table below.

Type of account	APR	Period	APY
Savings account	3%	Paid monthly	
CD	3%	Paid monthly	
Savings account	3.2%	Paid monthly	
CD	3.3%	Paid annually	



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

Calculate APY for the following accounts:

Type of account	APR	Period	APY
Savings account	2.8%	Monthly	
CD	3.1%	Annually	
Savings account	2.4%	Semiannually	
CD	2.4%	Quarterly	

- Savings account A has an APR of 2.2396% compounded monthly, savings account B has an APR of 2.2498% compounded quarterly, and savings account C has an APR of 2.2544% compounded semiannually. Which of the savings accounts has the highest APY?
- Over 1 year, how much more does \$3000 in a savings account with an APR of 1.8% compounded semiannually earn in interest than the same amount in a savings account with an APR of 1.6% compounded quarterly?
- If, in the previous problem, the \$3000 was left in the savings accounts for 2 years instead of 1 year, what would be the difference in the interest earned between the two accounts?
- Gordon had \$200,000 in a CD at Lots a Loot Bank, which just failed. If the FDIC insurance limit per depositor, per bank, is \$250,000, how much will Gordon get back?

Diana put \$8000 in a 10-year CD paying 5% interest compounded monthly. After 2 years, she withdrew all her money, and as an early withdrawal penalty, she paid back all the interest she made during the first year. How much money was Diana left with?

9.

10.

Kyle wants to have \$850,000 when he retires in a year. If he currently has \$800,000 to put in a 1-year CD, what APY will allow him to reach his goal?



Use your notes from the studies to begin your review. Check the questions and answers from the study sheets you got on the first page of each study.

Also, review the key terms for each lesson. They're found on each lesson overview page. Make sure you know what each key term means before you take the test.

The following checklist will help you figure out if you're ready to take the test. If you check "No" for any question, go back to the lesson and activity where the information appears, and review that information.

Question	Example	Yes	No
Lesson 1: Simple Interest			
Can you define interest?		<input type="checkbox"/>	<input type="checkbox"/>
Can you define principal?	Write the definition	<input type="checkbox"/>	<input type="checkbox"/>
What is simple interest?	Write the definition	<input type="checkbox"/>	<input type="checkbox"/>
Do you know how to calculate simple interest?	Write the formula	Yes	No
What does "time value of money" mean?	Give an example	<input type="checkbox"/>	<input type="checkbox"/>
What is present value?	Write the definition	<input type="checkbox"/>	<input type="checkbox"/>
What is future value?	Write the definition	<input type="checkbox"/>	<input type="checkbox"/>
Do you know how to calculate future value?	Write the formula	<input type="checkbox"/>	<input type="checkbox"/>
Lesson 2: Exponential Growth			
Can you define exponential growth?		<input type="checkbox"/>	<input type="checkbox"/>
What is the definition of exponential functions?	Write the definition	<input type="checkbox"/>	<input type="checkbox"/>
Do you know the general formula for exponential functions?	Write the formula	<input type="checkbox"/>	<input type="checkbox"/>
What is exponential decay?	Give two examples	<input type="checkbox"/>	<input type="checkbox"/>
What is e ?		<input type="checkbox"/>	<input type="checkbox"/>
Do you know how to evaluate exponential functions?		<input type="checkbox"/>	<input type="checkbox"/>
Do you know how to graph exponential functions?		<input type="checkbox"/>	<input type="checkbox"/>
Can you interpret graphs of exponential functions?		<input type="checkbox"/>	<input type="checkbox"/>
Lesson 3: Compound Interest			
Can you define compound interest?	Write the definition	<input type="checkbox"/>	<input type="checkbox"/>
How does compound interest compare to simple interest?		<input type="checkbox"/>	<input type="checkbox"/>

What is compounding frequency?	List the examples		
How is compound interest calculated?	First example text		
What is continuous compounding?			
What is the formula for continuous compounding?	Write the formula		
Do you know how to use the TVM Solver on your calculator?			
Lesson 4: Rule of 72			
Define the rule of 72			
What is the formula for the rule of 72?	Write the formula		
What is the rule of 69?	When is it used?		
What is the formula for the rule of 69?			
Do you know how the rule of 72 applies to GDP and inflation?			
Lesson 5: Checking Accounts			
Do you know what a checking account is?			
What are checking accounts used for?			
What is a check?			
What is a check register?			
What is a service fee?			
What is an overdraft fee?			
Can you name different parts of a check?	List three different parts		
Do you know how to fill out a check?			
Do you know how to endorse a check?	Write three different endorsements		
Do you know how to fill out a deposit slip?			
Do you know how to compare checking accounts?			
Lesson 6: Balancing Your Checkbook			
Do you know what a bank statement looks like?			
What is included on a bank statement?	Give two examples		
What is a reconciliation?			
Can you spot addition errors?			
By ones? Tens? Hundreds? Thousands?			
Can you identify transposition errors?	What number is difference divisible by?		
Lesson 7: Comparing Checking Accounts			
Do you know what an ATM fee is?	Write a definition		

What is a cost-per-check account?			
What are some requirements for a free checking account?	Give two examples		
What is an average balance account?			
Can you match types of accounts to the needs of account holders?			
Can you calculate total fees for an account?			
Can you compare two accounts based on fees they charge?			
Lesson 8: Savings Accounts			
Can you define a credit union?	Write the definition		
Can you define a savings and loan institution?	Write the definition		
What is an APR?			
What is an APY?			
Do you know the formula for calculating APY?	Write the formula		
Do you know how to find total interest when calculated daily but paid monthly?			
Lesson 9: Comparing Savings Accounts			
What is a basic savings account?	Write the definition		
What is a certificate of deposit (CD)?	Write the definition		
What is the savings bond?	Write the definition		
What is a money market account?	Write the definition		
Can you define liquidity?			
What other features differentiate savings accounts?	List two		
What is FDIC insurance?			
What is the amount protected by FDIC insurance?	Write the amount		
Can you compare APR vs. APY given different accounts?			



4.10.2 Practice: Checking and Savings

Mathematics of Personal Finance (S1225613)

Practice
Assignment

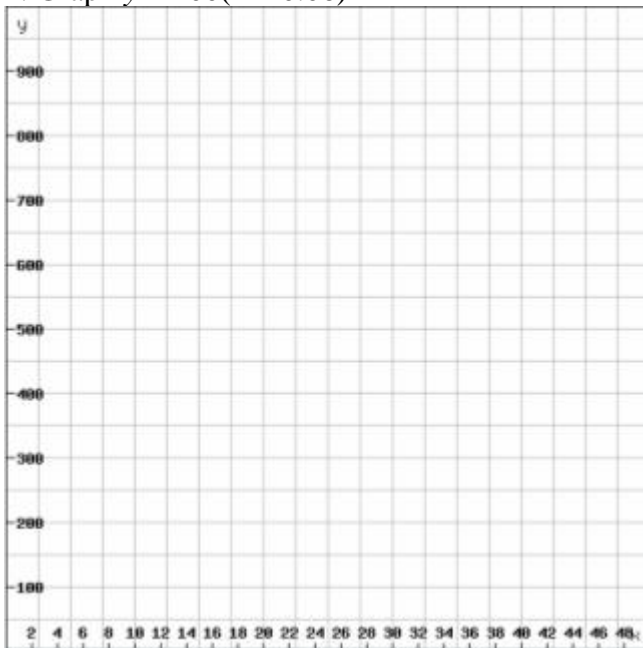
Name: _____

1. Find the amount of simple interest earned in one year on an account that has an interest rate of 3.2% and a principal of \$250.

2. What is the future value in one year of an account that has \$450 deposited in it, and earns a 2.1% annual interest rate?

3. If $f(x) = \left(\frac{1}{7}\right)(7^x)$, what is $f(3)$?

4. Graph $y = 100(1 + 0.06)^x$



5. Francisco invested \$5,000 into an account that earns 3% compounded quarterly. How many times will Francisco earn interest after keeping the money in the account for 5 years?

6. What will be the value of his account in 5 years if he does not make any additional deposits or withdrawals?
7. After how many years will Francisco's account reach \$10,000?

8. If Francisco wanted to double his money in 12 years, what interest rate would his account have to earn?

9. Jenna is writing a check to her vehicle registration office for \$100.42. How should she spell out this amount in the "written amount" section on her check?

10. Pete got a tax refund check in the amount of \$132.74. How should he endorse this check to make sure no one is able to cash it, if it were to get lost?

11. Raja is depositing checks he received and filling out a deposit slip. The two checks he is depositing are for the amounts of \$45.92 and \$5.78. If he wanted to withdraw \$20 at the same time, what amount should be written on the line highlighted by the green arrow?

12. Looking at the statement below, what is the current balance in the account if the beginning balance was \$894.83?

DEPOSITS		
JAN 7	Deposit	\$21.84
PAYMENTS		
JAN 1	Check 194 to Elijah's Shoes Store	\$174.25
JAN 3	Check 195 to Isabella's Books	\$180.96
JAN 11	Check 196 to Alyssa's Department Store	\$184.24

13. If Loretta accidentally recorded a deposit of \$47.88 as a debit in her register, by how much will her register differ from the bank statement?
14. United Bank charges a \$7.50 service fee and \$0.10 for each check written over 15 (the first 15 checks are free). Find the total amount of fees if Frank wrote 20 checks last month.
15. Bank A charges a \$4 service fee and \$0.25 for each check written. Bank B charges \$5 and \$0.20 for each check written. How many checks does a person need to write each month for the two banks to charge the same amounts in fees?
16. ABC Bank offers a savings account with 4.5% compounded quarterly. Find the APY the bank's savings account offers (round your answer to three decimal places).
17. The beginning balance of Zerina's savings account for the month of July was \$1800, and it remained this way for the first 12 days of the month. On July 13, Zerina made a withdrawal of \$400, so her balance changed, and it remained the same for a total of 8 days. On July 21, Zerina made a deposit of \$1200, so her balance changed again, and it remained the same for a total of 11 days to finish out the month. If Zerina's savings account has an APR of 7.3%, calculates interest daily, and pays interest at the end of the month, how much did Zerina earn in interest in the month of July?
18. Which term describes *the ability to access cash quickly*?
19. Bank A offers a savings account with a 6% APR compounded semiannually. Bank B offers the same rate but compounds monthly. If \$1000 is invested in both banks, find the difference in interest earned at the end of the year.
20. Up to what amount are one's deposits covered by FDIC?

