AWM 11 – UNIT 3 – INVESTING AND BORROWING MONEY

Assignment	Title	Work to complete	Complete
1	***Review: Percentages***	Decimals and Percent	
2	***Review: Percentages***	More Decimals and Percent	
3	***Simple Interest***	Simple Interest	
4	***Compound Interest***	Compound Interest	
5	***Comparing Compound Periods***	Comparing Compound Periods	
6	***The Rule of 72***	The Rule of 72	
	Quiz		
7	***Credit Cards***	Credit Cards	
8	***Store Promotions***	Store Promotions	
9	***Borrowing Money***	Borrowing Money	
Practice Test	**Practice Test** How are you doing?	Get this page from your teacher	
Self-Assessment	**Self-Assessment** ***"Traffic Lights"***	On the next page, complete the self-assessment assignment.	
Chapter Test	**Chapter Test** Show me your stuff!		

Traffic Lights

In the following chart, show how confident you feel about each statement by drawing one of the following: ☺, 😐, or ☹. Then discuss this with your teacher ***BEFORE*** you write the test!

Statement	☺ 😐 ☹
After completing this chapter;	
• I can solve simple interest problems	
• I can solve compound interest problems	
• I can use the Rule of 72 to estimate the time needed for an investment to double	
• I can solve problems that involve credit cards	
• I can describe different credit options including credit cards, personal loans, lines of credit and overdrafts	
• I can solve problems that involve store promotions	
• I can solve problems that involve different types of personal loans	
• I understand about the risks of borrowing money, especially from payday loan stores	

Vocabulary: Unit 2

amortization period
asset
cash advance
collateral
compound interest
compounding period
credit
default
down payment
finance charge
interest
line of credit
loan
overdraft protection
payday loan
principal
Rule of 72
simple interest
term

REVIEW: PERCENTAGES AND TIME

In this unit, you will need to convert percentage numbers to non-percentage numbers, and vice versa. It is important to review this process before beginning this unit.

A **percent** is a fraction out of 100. So if you got a mark of 86% on a test that means you got the equivalent of 86 out if 100.

A) To change a percent to a non-percentage, simply divide the percent number by 100.

Example: What is 67% as a non-percent?

Solution: 67% ÷ 100 = 0.67

B) To change a non-percentage to a percent, simply multiply the decimal by 100.

Example: Write the decimal 0.76 as a percent.

Solution: 0.76 × 100 = 76%

ASSIGNMENT 1 – DECIMALS AND PERCENTS

1) Write each percent as a decimal.

a) 25% = _____ b) 7% = _____ c) 0.5% = _____

d) 1.5% = _____ e) 47% = _____ f) 12.5% = _____

2) Write each decimal as a percent.

a) 0.65 = _____ b) 0.04 = _____ c) 0.12 = _____

d) 0.055 = _____ e) 0.1 = _____ f) 0.002 = _____

MORE DECIMALS AND PERCENT

Often we are asked to find a percent of a number. This can be done with a proportion, remembering that a percent is a number always out of 100. It can also be done by converting the percent to a decimal and multiplying. When the percentage is placed over 100, the % sign is dropped.

Example: Calculate 20% of 45

Solution A: Set up the proportion and solve.

$$\frac{\text{part}}{\text{whole}} \qquad \frac{20}{100} = \frac{x}{45}$$

$x = 20 \times 45 \div 100 = 9$ So, 20% of 45 is 9.

Solution B: Convert 20% to a decimal and multiply to solve.

$20\% \div 100 = 0.20$

$0.20 \times 45 = 9$

NOTE: If the percentage is greater than 100 – and it can be – your answer will be larger than the number you started with.

It is also possible to find the percentage given two numbers. To calculate what percent one number is of another means you need to determine what number out of 100 is equal to your ratio. Using a proportion or simplifying a fraction are the two ways to solve this type of question.

Example: What percent is 5 of 20?

Solution A: Set up the proportion and solve.

$$\frac{\text{part}}{\text{whole}} \qquad \frac{x}{100} = \frac{5}{20}$$

$x = 5 \times 100 \div 20 = 25\%$ So, 5 of 20 is 25%

Solution B: Convert 5 of 20 to a fraction $\frac{5}{20}$, divide the numerator by the denominator, and multiply by 100 to solve.

$5 \div 20 = 0.25$

$0.20 \times 100 = 25\%$

ASSIGNMENT 2 – MORE DECIMALS AND PERCENTS

1) Calculate the following percentages.

a) 15% of $300.00

b) 45% of $1500.00

c) 140% of $70.50

d) 175% of $24

e) 7.8% of $60.00

f) 0.3% of $175.75

g) 200% of $50.00

h) 135% of $29.95

2) Calculate what percentage the first number is of the second number.

a) $65 of $325.00

b) $135 of $405.50

c) $68.00 of $42.00

d) $13.50 of $65.25

e) $1.75 of $12.95

f) 625.00 of $50.00

INTEREST

When you deposit money into a savings account or make an investment, you earn interest from your financial institution because you are lending them your money. When you borrow money – take out a loan – you must pay interest to the financial institution. This interest is the cost for borrowing their money. So we can define **interest** as the amount of money paid or charged when you deposit or borrow money.

There are two ways that interest can be calculated; simple interest and compound interest.

SIMPLE INTEREST

Simple interest is interest that is based only on the original amount borrowed or invested. This original amount is called the **principal**. The percent of the principal that is paid or earned as interest called the **interest rate**. The interest rate is often stated as being "per annum" which means per year. The **term** is the length of time in years over which the money is deposited or borrowed.

The formula used to calculate simple interest is:

Interest (I) = Principal (P) × interest rate (r) × term (t)

$$I = Prt$$

When using this formula to calculate interest, substitute the values for their letters and multiply. Remember, the interest rate is written as a percentage and it must be changed to a non-percentage number before being used in a formula. To do this, divide it by 100.

7.25% ÷ 100 = 0.0725

Example 1: David invested $1500 for 2 years at an interest rate of 2.5%. How much interest did he earn?

Solution: Assign the values to their correct spot, substitute and solve.

I = ? P = \$1500 r = 2.5% ÷ 100 = 0.025 t = 2 years

$I = Prt$

I = 1500 × 0.025 × 2 = 75

David earned \$75 interest.

Sometimes, the term will not be given in years but rather days, weeks, or months. to use these lengths of time, divide each by how many there are in a year to get a part of a year.

t = Term (in years)

Ex. 2 years = 2

20 weeks = $\frac{20}{52}$ or **20 ÷ 52** There are 52 weeks in one year.

200 days = $\frac{200}{365}$ or **200 ÷ 365** there are 365 days in one year.

6 months = $\frac{6}{12}$ or **6 ÷ 12** There are 12 months in one year.

NOTE: when using these terms in your calculations, it is more accurate to use the division statement for the term than dividing first and using the rounded answer.

Example 2: Robin saved $600 for 6 months at 1.5%. How much interest will she earn?

Solution: Assign the values to their correct spot, substitute and solve.

I = ? P = \$600 r = 1.5% ÷ 100 = 0.015 t = 6 months = 6 ÷ 12

I = 600 × 0.015 × 6 ÷ 12 = \$4.50

Robin earned \$4.50 interest.

Example 3: Jasjot invested $5000 in a short term deposit for 120 days at 0.5%. How much interest will he earn?

Solution: Assign the values to their correct spot, substitute and solve.

I = ? P = \$5000 r = 0.5% ÷ 100 = 0.005 t = 120 days = 120 ÷ 365

$I = Prt$

I = 5000 × 0.005 × 120 ÷ 365 = \$8.219178082 (this must be rounded)

Jasjot earned \$8.22 interest.

For any investment, you can calculate the total value at the end of the term by using the formula:

$$\boxed{A = P + I}$$

where A is the final value of the investment.

So the total value of Jasjot's investment is

$A = P + I$ = \$5000 + \$8.22 = \$5008.22

So far we have only calculated the simple interest (I) in this equation. It is possible to calculate any of the other variables, principal, interest rate, or term, in one of two ways. First, we can use algebra to solve an unknown or secondly, we can rearrange the formula to isolate for the unknown we want. This is done for you below.

Other versions of this formula to use when finding rate, term, or principal:

$$r = I \div (P \times t) \times 100$$

$$t = I \div (P \times r)$$

$$P = I \div (r \times t)$$

NOTE: Type this into your calculator **exactly** as written - with brackets - to get the correct answer.

Example 4: Petra earned $30.24 in interest from her bank when she invested $1200 for 2 years. What was the interest rate she received?

Solution: Assign the values to their correct spot, choose the correct formula, substitute and solve.

I = \$30.24 P = \$1200 r = ? t = 2 years

$r = I \div (P \times t) \times 100$ (Multiply by 100 to get a percent)

r = 30.24 ÷ (1200 × 2) × 100 = 1.26

Petra's interest rate was 1.26%.

Example 4: Marcela is saving to buy a new computer. He needs $35 more to make the purchase. Her savings of $2900 are invested at 1.59%. How many days longer will she need to keep her investment in the bank in order to earn that $35 in interest?

Solution: Assign the values to their correct spot, choose the correct formula, substitute and solve.

I = \$35 P = \$2900 r = 1.59% ÷ 100 = 0.0159 t = ?

$t = I \div (P \times r)$

t = 35 ÷ (2900 × 0.0159) = 0.759054435 years

The questions asks for how many days, so multiply the term in years by 365 to get the answer in days

t = 35 ÷ (2900 × 0.0159) × 365 = 277 days

Marcela will need to save for 277 more days.

ASSIGNMENT 3 - SIMPLE INTEREST

1) Match each variable with a value by placing the correct letter on each line.

Variable	Value
a) principal	____ 280 days
b) interest	____ 1.95%
c) interest rate	____ $2000
d) term	____ $29.92

e) Using the values above, calculate whether the interest earned is the correct amount.

f) What is the total value of this investment?

2) Calculate the amount of simple interest earned in each of the situations.

a) principal = $1500 interest rate = 2.5% term = 5 years

b) principal = $3245 interest rate = 7.5% term = 3 years

c) principal = $500 interest rate = 11% term = 9 years

3) Peter invested $1860 for 10 months at a rate of 3.8%. How much interest did he earn?

4) What amount of principal invested at 6% for 2 years that generates $22 in interest?

5) Mike invested $4040 for 3 years and earned $410. What interest rate was this invested at?

6) How many months does it take to earn $180 in interest on an investment of the principal is $5000 and the interest rate is 2%?

7) Sarpreet borrowed $550. Four months later, he sent a cheque for $562.83 to repay the loan and interest. What was the interest rate charged?

8) Dorothy loaned John $5000 at an interest rate of 6%. He repaid her $5750 to cover the principal and interest. How long did he borrow the money?

COMPOUND INTEREST

Compound interest is another type of interest. It is interest that is calculated on the principal plus and interest previously earned. For example, if you keep the interest earned in your account, with **compound interest** the new interest is calculated on the principal plus that interest. Therefore, you will earn more interest than with simple interest.

Compound interest can be calculated using the simple interest formula in a chart to show the value of the investment after each compounding period.

Example 1: Calculate the value of an investment of $5000 that earns 2.35% per year, compounded semi-annually, for 4 years. Use a table to show the value of the investment at the end of each compounding period.

Solution: Complete this chart by using the simple interest formula (*I=Prt*) to calculate the interest earned each period. To calculate the last column, add the principal and the interest earned in that year. This then becomes the value at the beginning of the next period.

For our purposes, the term that is used will always be in years. Compound interest can also be paid more than once a year. This is called the **compounding period**. The compounding period could be annually (once a year), semi-annually (twice a year) quarterly (4 times a year), monthly (12 times a year), weekly (52 times a year), or daily (365 times a year).

P = \$5000 r = 2.35% ÷ 100 = 0.0235 t = 6 months ÷ 12

INTEREST TABLE

Interest period	*Investment value at the beginning of the period*	*Interest earned ($) I=Prt*	*Investment value at the end of the period*
1	\$5000.00	\$5000.00 × 0.0235 × 6 ÷12 = \$58.75	\$5000.00 + \$58.75 = \$5058.75
2	\$5058.75	\$5058.75 × 0.0235 × 6 ÷12 = \$59.44	\$5058.75 + \$59.44 = \$5118.19
3	\$5118.19	\$5118.19 × 0.0235 × 6 ÷12 = \$60.14	\$5118.19 + \$60.14 = \$5178.33
4	\$5178.33	\$5178.33 × 0.0235 × 6 ÷12 = \$60.85	\$5178.33 + \$60.85 = \$5239.18
5	\$5239.18	\$5239.18 × 0.0235 × 6 ÷12 = \$61.56	\$5239.18 + \$61.56 = \$5300.74
6	\$5300.74	\$5300.74 × 0.0235 × 6 ÷12 = \$62.28	\$5300.74 + \$62.28 = \$5363.02
7	\$5363.02	\$5363.02 × 0.0235 × 6 ÷12 = \$63.02	\$5363.02 + \$63.02 = \$5426.04
8	\$5426.04	\$5426.04 × 0.0235 × 6 ÷12 = \$63.76	\$5426.04 + \$63.76 = \$5489.80

The value of the investment after 4 years is \$5489.80.

Instead of completing this complicated calculation, a formula is used to achieve the same result. The formula for calculating compound interest is:

$$A = P \times (1 + r \div n)^{n \times t}$$

where,

A = Compounded or Final amount (principal + interest)

P = Principal (amount of money that was originally borrowed or invested)

r = Rate (interest rate – in decimal form)

Ex. 10% = 0.10

5% = 0.05

t = Term (in years)

Ex. 2 years = 2

n = Compounding period

Annually = 1	Monthly = 12
Semi-annually = 2	Weekly = 52
Quarterly = 4	Daily = 365

Example 1: What is the compounded amount if $5000 is deposited in an account for 2 years that pays 4.5% interest annually?

Solution: Assign the values to their correct spot, substitute and solve.

A = ? P = \$5000 r = 4.5% ÷ 100 = 0.045 t = 2 y n = 1

$A = P \times (1 + r \div n)^{n \times t}$

Here is the formula from above filled in with the known information:

$A = \$5000 \times (1 + 0.045 \div 1)^{1 \times 2}$

The part of this equation that says “1 × 2” is an exponent. You must know the answer to this expression before you begin calculating the rest of the expression even if it is a simple expression.

$1 \times 2 = 2$

$A = \$5000 \times (1 + 0.045 \div 1)^{2}$

Now type this into the calculator ***EXACTLY*** as it is written above. That means with the brackets. To get an exponent, use the “y^x” button, so your calculator strokes would be like this:

$5000 \times (1 + 0.045 \div 1) y^x 2$

The answer displayed on the calculator would be \$5460.125 which rounds to \$5460.13.

Example 2: Find the compounded amount if you where to put $400 in a bank account if the interest rate is 4.75% for 5 years and the interest is compounded weekly.

Solution: Assign the values to their correct spot, substitute and solve.

A = ? P = \$400 r = 4.75% ÷ 100 = 0.0475 t = 5 y n = 52

$A = \$400 \times (1 + 0.0475 \div 52)^{52 \times 5}$

$52 \times 5 = 260$

$A = \$400 \times (1 + 0.0475 \div 52)^{260}$

$A = \$507.175 = \$507.18$

Because the compounded amount, A, is made up of the principal and the interest earned, ***A = P + I,*** the amount of interest earned can be calculated by first calculating A, and then subtracting the original principal from that amount.

I = A – P Interest = Compounded Amount - Principal

Example 3: Margaret invested \$2000 in an account with an interest rate of 8% for 3 years, compounded quarterly. How much interest does she earn?

Solution: Assign the values to their correct spot, substitute and solve for A. Subtract to find the interest.

A = ? P = \$2000 r = 8% ÷ 100 = 0.08 t = 3 y n = 4

$A = \$2000 \times (1 + 0.08 \div 4)^{4 \times 3}$

$A = \$2536.48$

Interest = A – P = \$2536.48 - \$2000 = \$536.48

ASSIGNMENT 4 – COMPOUND INTEREST

1) Use the table below to show how much a deposit of \$2000, invested at 3.75% per year, compounded semi-annually for 2 years would be worth at the end of each compounding period.

INTEREST TABLE			
Interest period	*Investment value at the beginning of the period*	*Interest earned (\$) I=Prt*	*Investment value at the end of the period*
1	\$2000.00		
2			
3			
4			

2) Calculate the final amount of a deposit of $5000 invested at 3.1% per year, compounded annually for 5 years.

3) Calculate the final amount of a deposit of $650 invested at 4.75% per year, compounded monthly for 3 years.

4) Calculate the final amount of a deposit of $1000 invested at 7.25% per year, compounded semi-annually for 2 years.

5) Tabitha deposits $4275 into an investment account that offers 3.25% interest per year, compounded daily. How much will her investment be worth after 7 years?

6) Calculate how much **interest** you would earn on a deposit of $8500 at 2.75%, compounded annually, for a term of 4 years.

7) If Greg invested $500 for 5 years, compounded annually, at a rate of 6%, how much interest would he earn on his investment?

COMPARING COMPOUNDING PERIODS

Up until this point, we have only used the different compounding periods in isolation. But it is important to understand how these different compounding periods affect your investments.
To gain this understanding, you will complete the following chart comparing the interest earned on an investment where everything else remains the same.

ASSIGNMENT 5 – COMPARING COMPOUNDING PERIODS

1) Calculate the compounded amount and then the interest earned on an investment of $15 275.00 that earns interest at a rate of 5.25% per year for 8 years for each of the following compounding periods. Then complete the chart below.

a) annually

b) semi-annually

c) quarterly

d) monthly

e) weekly

f) daily

INTEREST TABLE		
Compounding period	*Compounded value (A)*	*Interest (I)*
Annually		
Semi-annually		
Quarterly		
Monthly		
Weekly		
Daily		

2) Which compounding period produces the greatest amount of interest on the investment?

3) Rank the compounding periods from greatest amount of interest produced to least amount of interest produced on the investment.

4) How would this affect your choice of an investment?

THE RULE OF 72

There is an easy and quick way to estimate how long it will take to double your investment if it is compounded annually. It is called the **Rule of 72**. The approximate time, in years, that it will take to double your money is found by dividing 72 by the interest rate after dropping the percent sign. The amount of the investment has no bearing on this "rule".

Years to double investment = 72 ÷ (interest rate as a percent)

Example: How long would it take to double an investment of $10 000 if it is invested at 2.75%, compounded annually?

Solution: Apply the Rule of 72.

Years to double investment = 72 ÷ (interest rate as a percent)
Years to double investment = 72 ÷2.75
Years to double investment = 26.18 years

It would take over 26 years to double an investment at an interest rate of 2.75%.

ASSIGNMENT 6 – THE RULE OF 72

1) Use the Rule of 72 to estimate how long it would take the following investments to double in value. All are compounded annually.

a) $6000 invested at 4%

b) $1500 invested at 9.35%

c) $2500 invested at 1.95%

d) $350 invested at 5.5%

2) If you wanted to double your money in 10 years, at what interest rate would you need to invest your money?

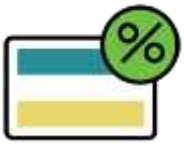
3) An investment offers a rate of 2.80% interest per year, compounded monthly. Use the Rule of 72 to determine how long it will take for the value to double. Round your answer to the nearest whole year.

4) Use the compound interest formula and an investment of $500 to check your answer to the question above.

ASK YOUR TEACHER FOR THE UNIT QUIZ.

CREDIT CARDS

In the first part of this unit, we have looked at different ways of *earning* interest on investments. There is another side to this story – that is when you borrow money or take out a loan to buy something that you pay for later. This is called buying on **credit**. Credit is the type of loan where the borrower receives something of value, and agrees to pay for it later. The best example of people buying on credit is when they use a credit card.



Credit cards have many good features – they are very convenient, and they are a way to improve your credit rating is by using a credit card responsibly, and only charging what you can pay off in full each month. But if you do not pay the balance by the due date, the credit card company charges you interest. The rates for most investments recently are fairly low – mostly less than 4%. However, if you borrow money or use your credit card and do not pay it off each month, the **finance charges** – the total amount of interest paid to borrow that money – are much higher. While you may get as little as 1.5% on an investment, you may have to pay 19.5% or more on an unpaid credit card balance! You may think this is illegal, but it is not. When you agree to use a credit card, these rates are published on each statement. However, people don't always read them carefully and can get into a lot of debt trouble using credit cards they can't pay off each month.

To calculate the interest due on credit card accounts, the simple interest formula is used. Be careful to convert the interest rate to a non-percentage number, and to accurately determine the term in years.

Example 1: Calculate the interest due on an unpaid credit card balance of $2067.45 at a rate of 19.5% for 17 days.

Solution: Assign the values to their correct spot, substitute and solve.

I = ? P = \$2067.45 r = 19.5% ÷ 100 = 0.195 t = 17 days= 17 ÷ 365

I = 2067.45 × 0.195 × 17 ÷ 365 = \$18.78

The interest due is \$18.78.

You may not think this is very much money, but consider that this is just for 17 days!

Example 2: Ray has an unpaid credit card balance of \$4384.67 that charges an interest rate of 19.5%. His payment was due on March 23 and he paid the minimum of \$50. What will his balance be on April 15?

Solution: Calculate the term, assign the values correctly, substitute and solve.

The term is: March 23 to March 31 = 9 days, and April 1 to April 15 = 15 days

t = 9 + 15 = 24 days

I = ? P = \$4384.67 r = 19.5% ÷ 100 = 0.195 t = 24 ÷ 365

I = 4384.67 × 0.195 × 24 ÷ 365 = \$56.22

The interest due is \$56.22 (which is more than his payment last month!)

Ray's new balance = \$4384.67 + \$56.22 = \$4440.89

Credit card companies require you to pay a minimum payment each time they issue a statement. This **minimum payment** is a percentage of the unpaid balance or a flat dollar amount, usually whichever is greater. Credit card companies are now required by law to print on monthly statements how long it will take to pay off a balance if no further purchases are made and if only the minimum payment is made each month. It can be a scary amount of time for a small balance! Here is an example.

	Previous Balance	$225.52	Credit Limit		$5,000.00
LESS	Payments & Credits	$230.00	Available Credit Limit		$4,740.31
PLUS	New Charges/Adjustments inc. Interest, if any	$264.17	Available Cash Limit		$1,000.00
EQUALS	New Balance	$259.69			
			Payment Period Remaining		
Minimum Amount Due on Sep 3, 2011		**$10.00**	If each month you pay the Minimum Amount Due only		2 Year(s) 9 Month(s)

Statement includes payments and charges received by Aug 13, 2011

Minimum Payment - The Minimum Payment is (i) 3% of the outstanding balance as of the statement Closing Date or $10.00, or the entire new balance if it is less than $10.00, plus (ii) any previously billed minimum payments that remain unpaid on the Closing Date of the statement.

Example 3: Max has an unpaid balance on his credit card of $494.95. His credit card company charges an interest rate of 19.75%. Max must pay a minimum payment of 12.5% or $75, whichever is greater. What is Max's minimum payment?

Solution: Calculate the minimum payment multiplying the rate by the amount.

balance = $494.95 r = 12.5% ÷ 100 = 0.125

Payment = 494.95 × 0.125 = $61.87

The amount $61.87 is less than $75.00, so Max must pay $75.00.

Another way that credit card companies make money is by charging higher rates for cash advances. A **cash advance** is a withdrawal of cash from a bank or ATM machine charged to a credit card. The interest rate charged for a cash advance is usually higher than for purchases, and it is calculated from the day you withdraw the cash advance.

Example 4: On March 12, Jill charges a cash advance of $500 to her credit card. This charge appears on her monthly statement issued on March 27. Jill does not make any other purchases with her credit card. Jill's bank charges a 22% interest rate for cash advances, starting on the day of the withdrawal. How much interest does Jill currently owe for this cash advance?

Solution: Calculate the term, assign the values correctly, substitute and solve.

The term is: March 12 to March 27 = 15 days,

I = ? P = $500.00 r = 22% ÷ 100 = 0.22 t = 15 ÷ 365

I = 500 × 0.22 × 15 ÷ 365 = $4.52

The interest due is $4.52.

ASSIGNMENT 7 – CREDIT CARDS

1) How much interest is due on an unpaid credit card balance of $1047.28 at a rate of 21.25% for 27 days?

2) How much interest is due on an unpaid credit card balance of $2111.67 at a rate of 18.5% for 5 months?

3) Adam has an unpaid credit card balance of $765.43 that charges an interest rate of 19.75%. If his payment was due on September 23, how much interest will he owe on October 14? Hint: September has 30 days.

4) Debbie has an unpaid credit card balance of $568.93. Her credit card company charges 24% per year, counting each day that an amount is owed. If she did not pay anything on July 10, her due date, how much does she owe on her next statement date, August 2? July has 31 days.

5) Stuart has an unpaid credit card balance of $268.67. What is his minimum payment if his credit card company charges an interest rate of 18.25%, and Stuart must pay 3% or $25, whichever is greater?

6) If Jamie took a cash advance of $259 on her credit card for 42 days and is charged an interest rate of 21.75%, how much interest will she be charged for that period?

7) Harvey used his credit card to make the following purchases during the month. He does not have a previous balance

Date	*Item*	*Amount*
July 3	Oil Change	$107.42
July 6	Groceries	$139.88
July 10	Gas	$62.00
July 15	Groceries	$89.71
July 19	Dinner	$47.69
July 22	Plane ticket	$725.27

a) What is his balance due on his statement date of July 27?

b) If the minimum payment is 5% or $25.00 whichever is greater, what is Harvey's minimum payment?

c) If Harvey only pays the minimum payment and doesn't use his credit card between July 27 and August 27, how much will he owe on his statement on August 27?

STORE PROMOTIONS

Stores want your business! They want you to buy their products, especially big ticket items that cost a lot. So what do stores do to encourage you to buy their product? They advertise special deals like "*Buy Now! No Down Payment*" or "*Free Delivery*" or "*Make No Payments for One Year*" and others. A down payment is a partial payment sometimes required at the time of purchase to secure the purchase. The rest of the cost of the purchase is paid off over time, and usually at a high interest rate.

Example 1: Michelle needs to buy a new refrigerator. The store has one she likes for $999.95 and there is a promotion running that offers "*Nothing Down and 4 Easy Monthly Payments of $275*." Michelle decides to buy the refrigerator on this plan.

a) What is the cost of the refrigerator on the payment plan?

b) Use the simple interest formula to calculate what rate of interest Michelle is being charged.

Solution: a) Multiply the payment by 4.

$274 × 4 = $1100

The cost of the refrigerator on the plan is $1100.

b) Calculate the difference in cost and list price, assign the values to their correct spot, choose the correct formula, substitute and solve.

The difference in price is: $1100.00 - $999.95 = 104.95

This is the interest charged.

The Principal is always the original cost.

I = $104.95 P = $999.95 r = ? t = 4 months = 4 ÷ 12

$r = I \div (P \times t) \times 100$

r = 104.95 ÷ (999.95 × 4 ÷ 12) × 100

r = 31.2%

The interest rate charged is 31.2%. WOW!

Sometimes stores will give you the option to choose between two (or more) different payment options for payment if you cannot afford to pay cash at the time of purchase. Be sure you understand all the details of any promotion or payment option before you commit to it.

Example 2: A store offers a bike for sale. Your payment options are:

Option 1: Pay cash of $639.98 plus 12% tax.
Option 2: Pay 10% down payment then 6 monthly payments of $115.00 (no tax)
Option 3: No down payment, and then 24 monthly payments of $35.00 (no tax)

Which payment plan offers the best deal?

Solution: Calculate each option and then compare the results.

Option 1: Multiply the price by the tax rate and add the results together.
$639.98 × 0.12 = $76.80
Total = $639.98 + $76.89 = **$716.78**

Option 2: Calculate 10% and add 6 payments of $115.00
$639.98 × 0.10 + 6 × $115.00 = $64.00 + $690 = **$754.00**

Option 3: Multiply 24 payments by $35.00
$35.00 × 24 = **$840.00**

The best deal is the cash price.

Notice that the longer you finance the purchase (24 months) the higher the overall cost, even if the monthly payments are lower.

ASSIGNMENT 8 – STORE PROMOTIONS

1) Jessica is buying a new big screen TV priced at $1599.99. She can pay the cash price or take the sale promotion of "No Down Payment and 24 Easy Monthly Payments of just $95!" If Jessica chooses the Easy Monthly Payments, how much will she pay for the TV, and what interest rate is she paying?

2) Justin bought a new car. The cash price (including tax) was $32 456.75, but he is paying monthly installments of $675 for 60 months. What interest rate is he paying?

3) Considering interest rate only, which is the better option on a $495.80 purchase?

Option 1: 4 monthly payments of $140.00

Option 2: 6 monthly payments of $90.00

4) Valerie needs to buy a new living room set. Her payment options are:

Option 1: Pay cash $2945.00 plus 12% tax.

Option 2: Pay 15% down payment then 10 monthly payments of $300.00 (no tax)

Option 3: No down payment, and then 6 monthly payments of $555.00 (no tax)

How much does each option cost? Which payment plan offers the best deal?

BORROWING MONEY

While it usually is a good idea to wait until you have saved up enough money to make buy something, sometimes it makes sense to borrow money and then pay it back over time. For example, you might want to buy a vehicle so you can transport tools for your job. Or you might need to pay for some schooling or training like an apprenticeship to help you with your career. Perhaps the biggest purchase you will make in your life would be a house or condo. If you waited until you had saved enough money for that, you would probably never buy it!!

Borrowing money and paying it back according to the arrangements you have made also helps to build up your credit rating. This allows you to borrow more at a later date when you might want to make a bigger purchase – remember that condo

There are different ways and places to borrow money. Usually we think of a **loan** when we think of borrowing money. A loan is a fixed amount of money that you borrow all at once. It is paid back over a specified term and interest is included in what you pay back. This length of time required to pay the loan back is called the **amortization period**. You will usually sign an agreement with your bank or credit union to make this a contract.

Other ways to borrow money include a line of credit, overdraft protection, and payday loans. A bank **line of credit** is a preapproved loan that lets you borrow on as needed up to a certain limit. Interest is charged but only on the money you use and only when you use it. It is similar to a credit card.

Overdraft protection is an agreement with your financial institution that allows you to withdraw more money from your account than you have in it, up to an agreed limit. The bank will cover the extra you have taken out, but you must repay. Interest is charged and it is usually at a higher rate like credit cards. Just like a line of credit, you only get charged if you use this service.

You have probably seen “stores” or TV commercials where you can borrow money without going to a bank of other financial institution. This type of short-term loan is often called a **payday loan** because the term is usually only until your next pay day. These are usually not a good idea as they charge very high rates of interest and it is compounded daily. Many people get into a lot of financial trouble thinking these loans can get actually get them out of trouble.

Some loans are secured with **collateral**, an item of value promised by the borrower that will be surrendered if the loan is not paid. This often is a car or property. Whichever type of loan you take out, if you do not make your payments as agreed in your contract, you are said to be in **default**, and legal action can be taken against you.

Example 1: Oscar borrowed $3500 from his bank to purchase a mountain bike. The loan has an annual interest rate of 8.25% and an amortization period of 2 years.

a) What is Oscar's monthly payment?

b) Calculate the total amount Oscar will pay over 2 years.

c) Calculate the finance charge on the loan.

Solution: To complete this question, you must use the *Personal Loan Payment Calculator* on the next page. This gives the monthly payment information for each $1000 borrowed based on the interest rate and the term of the loan.

a) From this sectionof the chart, you can see that for 2 years at an interest rate of 8.25%, Oscar will have to pay $45.34 a month for each $1000 he borrows.

PERSONAL LOAN CALCULATOR: MONTHLY PAYMENT PER 1000.00 BORROWED (INTEREST COMPOUNDED MONTHLY)					
Interest rate (%)	*Term in years*				
	1	***2***	***3***	***4***	***5***
8.00	86.99	45.23	31.34	24.41	20.28
8.25	87.10	45.34	31.45	24.53	20.40
8.50	87.22	45.46	31.57	24.65	20.52

To calculate Oscar's monthly payment, divide the amount of the loan by $1000 and multiply it by $45.34.

monthly payment = $3500 ÷ $1000 × $45.34 = $158.69
Oscar's monthly payment is $158.69

b) To calculate the total amount that Oscar will pay over 2 years, multiply his monthly payment by the number of months he is making that payment.

2 years = 24 months (2 × 12 months in a year)
Total paid over 24 months = $158.69 × 24 = $3808.56
Oscar paid a total of $3808.56 for the bike over 2 years.

c) The **finance charge** is the difference between the cash price of $3500 and the amount that Oscar paid for the bike by taking out a loan. This represents the extra or interest that Oscar paid for the privilege of paying the loan off over 24 months.

finance charge = $3808.56 - $3500 = $308.56

PERSONAL LOAN CALCULATOR: MONTHLY PAYMENT PER 1000.00 BORROWED (INTEREST COMPOUNDED MONTHLY)					
Interest rate (%)	*Term in years*				
	1	***2***	***3***	***4***	***5***
3.00	84.69	42.98	29.08	22.13	17.97
3.25	84.81	43.09	29.19	22.24	18.08
3.50	84.92	43.20	29.30	22.36	18.19
3.75	85.04	43.31	29.41	22.47	18.30
4.00	85.15	43.42	29.52	22.58	18.42
4.25	85.26	43.54	29.64	22.69	18.53
4.50	85.38	43.65	29.75	22.80	18.64
4.75	85.49	43.76	29.86	22.92	18.76
5.00	85.61	43.87	29.97	23.03	18.87
5.25	85.72	43.98	30.08	23.14	18.99
5.50	85.84	44.10	30.20	23.26	19.10
5.75	85.95	44.21	30.31	23.37	19.22
6.00	86.07	44.32	30.42	23.49	19.33
6.25	86.18	44.43	30.54	23.60	19.45
6.50	86.30	44.55	30.65	23.71	19.57
6.75	86.41	44.66	30.76	23.83	19.68
7.00	86.53	44.77	30.88	23.95	19.80
7.25	86.64	44.89	30.99	24.06	19.92
7.50	86.76	45.00	31.11	24.18	20.04
7.75	86.87	45.11	31.22	24.29	20.16
8.00	86.99	45.23	31.34	24.41	20.28
8.25	87.10	45.34	31.45	24.53	20.40
8.50	87.22	45.46	31.57	24.65	20.52
8.75	87.34	45.57	31.68	24.77	20.64
9.00	87.45	45.68	31.80	24.89	20.76
9.25	87.57	45.80	31.92	25.00	20.88
9.50	87.68	45.91	32.03	25.12	21.00
9.75	87.80	46.03	32.15	25.24	21.12
10.00	87.92	46.14	32.27	25.36	21.25

Example 2: Teresa's car payment of $450.00 is due in 3 days and she does not have enough money to pay it. She went to a payday loan store for a loan. She had to repay the store $536.30 within 14 days.

a) What is the daily interest rate for the loan?

b) What is the annual interest rate of the loan?

Solution:

a) Calculate the interest paid, and use the simple interest formula with time in days.

Teresa paid $536.80 - $450.00 = $86.80 in interest

I = $86.80 P = $450.00 r = ? t = 14 days

$r = I \div (P \times t) \times 100$

r = 86.80 ÷ (450.00 × 14) × 100

r = 1.38%

The daily interest rate is 1.38%

b) To calculate the annual or yearly interest rate, multiply the daily interest rate by the number of days in a year – 365 days.

1.38% × 365 = 503.7%

The yearly interest rate is 504%. WOW!!!

This is why payday loans are ***not*** a good idea.

Example 3: Chris borrowed $125.00 from a payday loan store and agreed to repay it in 25 days at an interest rate of 1.20% per day. How much will Chris have to repay?

Solution: Use the simple interest formula using the interest rate as a daily rate and the term in days.

I = ? P = $125.00 r = 1.20% ÷ 100 = 0.012 t = 25 days

$I = Prt$

I = 125.00 × 0.012 × 25 = $37.50

Now add the interest to the amount that Chris borrowed to get the total amount.

$A = P + I$

A = $125.00 + $37.50 = $162.50

Chris will have to repay a total of $162.50 to the loan store.

ASSIGNMENT 9 – BORROWING MONEY

1) Marie is buying a new snowmobile that costs $11 500.00. She will take a loan from her bank at 4.75% for 4 years.
   a) Calculate Marie's monthly payment.

   b) Calculate the total amount Marie will pay for the loan over the 4 years.

   c) Calculate Marie's finance charge on the loan.

2) Tim wants to buy a used car that costs $3900.00. He has saved $1500.00 for a down payment on the car.
   a) How much will Tim have to borrow from the bank to buy the car?

   b) Tim can get a loan at 3.25% for 3 years from his bank. What will his monthly payment be?

   c) What is the total amount Tim will pay for the loan over the 3 years?

   d) How much will Tim pay in total for the car?

3) Haylie borrowed $325.00 from a payday store, and 10 days later she paid back the loan and interest with a cheque for $365.50.

a) What was Haylie's daily interest rate?

b) What was Haylie's annual interest rate?

4) Brad borrowed $250.00 from a payday loan store. He paid back the loan and interest 9 days later. His annual rate of interest was 425%. How much interest did Brad pay?

5) Mike borrowed $725.00 from a payday loan store and agreed to repay it in 15 days at a daily interest rate of 1.67%. How much in total did Mike repay the store?

6) Gurpreet agreed to pay $527.50 to a payday company that gave him a loan of $485.00 at 1.10% per day. How many days did he have the money?