Car Buying Unit

Introduction
This unit introduces students to some of the basic math that a person should consider when taking out a car loan. You need to have access to the internet – the lessons use an online auto payment calculator and website(s) to look up new and used car prices. In the first lesson, the basics of simple and compound interest are taught. The students also look at the total cost of the car after the loan is paid off, and the total amount that was spent on interest. In the second lesson, the students look at the three variables that determine monthly car payments – the interest rate, amount of loan, and length of loan. Two of these variables are held constant as one is changed, and the student can see how each variable can effect the monthly payment and total amount spent on the car. Next, car depreciation is explored. The students then look at amortization charts and compare this information to depreciation rates, to understand what it means to be upside down in their car payments. Lastly, the students are given a project. They are given a scenario and must use what they have learned to find a car (on the internet) that they can afford and present the information to the class.

This unit, like the other units in this course, is meant to be done in small groups. I have found that when working on computers, because of their physical layout, it is difficult for 3 or more people to communicate and work together. I have found that pairs work best. The math skills involved are basic arithmetic, percents, graphing, and logical reasoning. Since I am not teaching new math concepts (except for simple and compound interest), I like to give students the problem first and see what they can reason through on their own, before showing them how to do it. The worksheets reflect this approach.

This unit was written in the spring of 2007. The interest rates and car values on the worksheets are the ‘real world’ numbers of that time. You will want to get current interest rates and car values and insert them into the worksheets (you can find them on the internet). Also, as explained in the second lesson, the interest rate you pay for a car loan is directly tied to your credit score. This is a good place to pass along to students some basic information about credit reports – what they are and the kind of things that affect them. Perhaps someone from a local bank would be willing to talk with the students. If not, then it would be helpful to find out some information yourself and pass it along. Most students have never heard of a credit report and have no idea of the kind of financial trouble they could get themselves into.

Lastly, this unit could be shortened or expanded. If the students do not do the project, you could do this unit in three lessons (instead of five). Some ideas for expansion are to teach the students power point and have them use it to present their project. You could also create lessons to show the financial considerations of leasing a car, and, lessons to show students the total cost of transportation – insurance, commuting costs (gas prices), maintenance, and excise taxes.
Class #1, Simple and Compound Interest

The students will be introduced to simple and compound interest calculations. Next, they will begin some basic car calculations. Given the cost of the car, the down payment, the monthly payment, and length of the loan, they are to calculate the total cost of the car and the amount of interest paid.

Go over the Simple Interest handout as a class. Next, is a worksheet with some practice problems. Do the first problem together so the students can see how to handle calculations with months. Then go over the Compound Interest handout together. Next is a practice problem. On the same sheet is a Buying a Car problem. See if the students, working together, can figure this out on their own before giving them guidance or hints. The homework covers the problems up to this point. There should still be class time left, so have the students start on the next lesson, the Buying a Car packet, which is in lesson 2.

Grading
A sample grade sheet could be:
Stocks (15 points) ______
Student took good notes
Simple interest (5 points) ______
Compound interest (5 points) ______
Worksheets
Simple interest (10 points) ______
Compound interest(10 points) ______
Student began Buying a Car packet ( 5 points) ______
Total (50 points) ______
Simple Interest

Theresa Evans opened the envelope and read the advertisement for a $5,000. According to the ad, all she had to do was complete the application form and the consumer finance company would lend her $5,000. If she qualified, the money would be mailed within seven days and there were no strings attached. The money could be used to pay bills, to take a vacation, to make a down payment on a new car, or for anything else that the borrower thought was important.

With $5,000, Theresa thought she could make a down payment on a new Ford Escort and use the remainder to pay off her credit card debt. And the best part, according to the advertisement, was that the finance company charged only 18 percent annual interest.

Theresa knew there was normally a charge for borrowing money, and an 18 percent interest rate sounded reasonable. But when she determined the dollar amount of the interest, she was astounded. A $5,000 loan would cost her $900 in interest if she paid off her loan at the end of 12 months. That works out to $75 a month just for interest.

Taken from Business Math Essentials, Robert Hughes, Glencoe, 1997

Interest –

Interest for one year:

Interest per month:

Principal –

Principal per month:

Total monthly payment:

Interest for two years:

\[
\text{Simple Interest} = \text{Principal} \times \text{Rate} \times \text{Time}
\]

\[I = P \times R \times T\]
Simple Interest Practice Problems

1. Find the interest for a $2000 loan at 8 percent for five months.

2. Find the interest for a $3000 loan at 7 and 1/2 percent for one year.

3. Find the interest for $10,000 loan at 6.75% for two years.

4. Find the interest for a $3200 loan at 5.99 percent for ten months.

5. Find the interest for a $2500 loan at 19.5% for one year.
Compound Interest

Compound interest is money paid on both the principal AND the interest that has already been paid on the principal. You are, in effect, paying interest on the interest. Compound interest is calculated at regular intervals such as every three months (quarterly), every month, or even every day. Compound interest is complicated and we will use online calculators for our calculations. The following example shows the basics of how compound interest works.

What is the new principal at the end of one year on a $2000 loan at 8% interest if the interest is compounded quarterly?

<table>
<thead>
<tr>
<th>Quarter</th>
<th>$P \times R \times T$</th>
<th>New Principal</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2</td>
<td></td>
<td></td>
</tr>
<tr>
<td>3</td>
<td></td>
<td></td>
</tr>
<tr>
<td>4</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

How much was paid in interest? _______

Compare this to a simple interest calculation:

$$I = \quad \text{difference:} \quad$$
Compound Interest Practice Problem

1. What is the new principal at the end of 6 months on a $2500 loan at 15% interest if the interest is compounded monthly? (This is very similar to a credit card loan.) You will need to set up a table similar to the class notes. Round to the nearest cent.

Buying a Car

2. You want to buy a new car for $15,000 and will put $1500 down. You have a finance rate of 6.25% for 4 years. This gives you a monthly payment of $318.60 per month. Calculate the total cost of the car:

Calculate the total amount of interest paid:

What percent of the price of the car ($15,000), have you paid in interest? Round to the nearest tenth.
Homework

Simple Interest

1. Find the interest for a $2500 loan at 17% for 6 months.

2. Find the interest for a $3000 loan at 9% for 18 months.

Compound Interest

3. What is the new principal at the end of 6 months on a $1200 loan at 16% interest, if the interest is compounded monthly? (This is very similar to a credit card loan.) You will need to set up a table similar to the class notes. Round to the nearest cent.

Buying a Car

4. You want to buy a new car for $14,000 and will put $1100 down. You have a finance rate of 6.25% for 4 years. This gives you a monthly payment of $304.44 per month. Calculate the total cost of the car:

Calculate the total amount of interest paid:

The interest is what percent of the car? Round to the nearest tenth.
Answers for Simple Interest Handout
Interest – amount paid for use of borrowed money

Interest for one year: \( 0.18 \times 5000 = $900 \)

Interest per month: $75

Principal – amount of money borrowed

Principal per month: $416.67

Total monthly payment: $491.67

Interest for two years: \( 0.18 \times 5000 \times 2 \)

Note: this leads into the formula \( I = P \times R \times T \)

Answers for Simple Interest Practice problems
1. $66.67 2. $225 3. $1350 4. $159.73 5. $487.50

Answers for Compound Interest Handout
Quarter \( I = P \times R \times T \) New Principal
1 \( I = (2000)(.08)(3/12) = 40 \) 2040.00
2 \( I = (2040)(.08)(3/12) = 40.80 \) 2080.80
3 \( I = (2080.80)(.08)(3/12) = 41.60 \) 2122.40
4 \( I = (2122.40)(.08)(3/12) = 42.45 \) 2164.85

How much was paid in interest? 164.85

Compare this to a simple interest calculation:
\( I = (2000)(.08)(1) = 160 \) difference: 4.85

Answers for Compound Interest practice problem worksheet
1. month \( I = P \times R \times T \) New Principal
   1 \( (2500)(.15)(1/12) = $31.25 \) 2531.25
   2 \( 31.64 \) 2562.89
   3 \( 32.04 \) 2594.93
   4 \( 32.43 \) 2627.37
2. (\(318.60\))(48) = 15,292.80 + 1500 down payment = $16,792.80

\[16,792.80 - 15,000 = 1792.80\]

\[
\frac{1792.80}{15,000} \times 100 = 12\%
\]

Answers to homework
1. $212.50  
2. $405  
3. $1299.26  
4. $15,713.12, $1713.12, 12.2\%
Class 2, Basics of Car Loans

There are three variables that determine the monthly payment of a car loan. They are the interest rate, the length of the loan, and the amount of the loan. This lesson explores these variables. Two variables are held constant, and one is changed. The monthly payments are calculated on an auto payment calculator on the internet. The students see how, as one of the variables changes, the cost of the car changes.

First, the interest rate is varied. The interest rate is based on your credit score. This would be a great place for a guest speaker to talk with the students about what a credit report is, and the kinds of things that affect your credit rating. Call a bank and get current interest rates for each credit score, and change the worksheet to reflect this. Next, the students explore how changing the amount down, changes the monthly payment and total cost of the car. Lastly, the students see how changing the length of the loan, effects the monthly payment and total cost of the car. The last question asks students to use these ideas to weigh the advantages and disadvantages of buying a new or used car.

Pass out the Buying a Car packet. This is in file called BuyingaCarPacket (the margins are different so it had to be in a separate file). Go over the top part of page one together, through the calculations for credit score A. Be sure everyone knows how to use the Auto Payment calculator. Working in pairs, have the students work through the rest of the packet themselves. Check their work carefully for questions 3 and 4. Many make errors here; it can be a bit confusing. Problem 5 is meant for a class discussion. After discussing problem 5, pass out the Buy Better on the Web sheet. This is from Consumer Reports, April, 2007. Under “Steer clear of these car-buying mistakes”, point out “Financing for longer than 48 months”, and “Blindly accepting dealer finance”. Explain to students that the 48 months are guidelines, and we will be exploring the ideas mentioned here next week. Also, it is a good idea to line up your best interest rate before going to the car dealer. The dealer can sometimes get you a better rate, and sometimes not. Dealers make money when they sell car loans. But if you don't do your homework before going to the dealer, you won't know.

Grading
A sample grade sheet could be
Stocks (10 points) ______
Car packet (40 points) _____
Total (50 points) ______

The homework covers up to this point. If the students started this packet in class one, they will not need all of class two to finish. You can start on the next lesson, Depreciation, in class 3.
Buy better on the Web

NOW YOU'RE IN THE DRIVER'S SEAT

If you dread the idea of haggling face-to-face with a car salesperson, slogging from dealer to dealer, or searching in vain for the exact model you want, relief might be just a few mouse clicks away. The Internet can help you find the right model, search numerous dealers' inventories, and even nail the best price.

Indeed, our own automotive experts often use the Internet along with e-mail and phone when anonymously buying the more than 80 cars and trucks Consumer Reports tests annually. Here are five important steps that they and our other experts recommend:

1. Zero in on models. Find some suitable models for your taste and price range by reading the new-car reviews, ratings, and reliability and safety data in this issue. ConsumerReports.org subscribers can access our full test reports online. It might also be helpful to check the owner reviews posted on our site and on other car-related sites. You can compare models side by side online using CR's New Car Buying Kit ($39; see ad in this issue). You can also print out details on the models and options you've chosen at the carmakers' own Web sites.

2. Take a test spin. The Internet is still no substitute for a test drive. Do your best to focus on the car and its handling and not be distracted by the salesperson's small talk. While you're at the dealership, don't try to negotiate a price; instead, get an e-mail address and a phone number so that you can do so later.

3. Go price shopping. Many carmakers' Web sites let you configure the vehicle the way you want it, then forward the results to dealers who can get back to you with offers. Many sites, such as GM's and Nissan's, also let you search dealer inventory. In our experience, however, it's often faster to contact dealers directly by phone. To be sporting about it, don't forget to give the dealership where you took your test drive a chance to bid.

Be as specific as possible about the model and options you have in mind. Stress that you've ready to buy and want the dealers to give you their best price, including a complete list of any additional fees.

To put those offers in perspective, it helps to know how much room the dealer has to haggle. You can find what the dealer paid for the car, as well as any rebates and factory-to-dealer incentives, at car-pricing Web sites or by ordering a Consumer Reports New Car Price Report ($14 each, or free with the New Car Buying Kit mentioned earlier).

If you're curious about what others have paid for similar models, check the car-pricing forum at Edmunds.com or the new free auto prices forum at ConsumerReports.org, which should be up and running by the time this issue comes out.

4. Drive a better bargain. If you aren't satisfied with the prices you're offered, don't hesitate to phone or e-mail the dealers again, asking whether they can beat the best offer you got in the first round. If that doesn't get you any closer, consider switching to one of your alternative models.

5. Close the deal. Once you find an acceptable price, call the dealer to verify the numbers. Emphasize that you don't want to see extra fees or other surprises when you show up to close the deal. If you're planning to finance, go in knowing the loan rates available elsewhere and ask the dealership for its best rate.

Steer clear of these car-buying mistakes

Yielding to pressure. Don't get bullied into buying until you've done all your shopping. (It's a myth that federal law gives you three days to cancel an auto contract.) Use a credit card for your deposit instead of a check. That will give you more protection if there's dealer hanky-panky.

Financing for longer than 48 months. Long-term loans come with higher interest charges. And they increase the chances you'll owe more than the car's worth if it's stolen or wrecked or if you decide to trade it in early. Consider taking a shorter loan or buying a reliable used car.

Taking the dealer's word for it. Whether it's free oil changes or anything else, make the dealership write any promises into the contract.

Buying unnecessary add-ons. Say no to dealer VIN glass etching, rustproofing, fabric protection, paint sealant, and extended service plans. Ditto for any expensive extras you might never use.

Blindly accepting dealer financing. Compare current car loan rates at www.bankrate.com, and then get your best offers from banks, credit unions, and online sources such as www.carloan.com. If the dealer can't beat your best rate, finance elsewhere.

Failing to negotiate a lease price. Dicker just as if you were buying, and make sure the dealer uses that price on the basis for your lease payments.

Leasing because you're financially strapped. Yes, leasing can give you a lower monthly payment, but you won't own the car at the end, and you'll pay a much higher finance charge. Consider buying a reliable used car instead.

Talking trade-in too soon. Don't mention trading in your old car until you've completed negotiations on the new one.
Homework

1. What are the three variables, or numbers, that will determine your monthly auto loan payment?

2. As a general guideline, what percent of your monthly take home pay should you spend on a car?

3. If your monthly take home pay is $1500, what is the highest monthly payment you should have for a car? (Assume you follow the general guideline.)

4. You want to buy a new car for $15,000 and will put $1500 down. You have a finance rate of 6.25% for 4 years. This gives you a monthly payment of $318.60 per month. Calculate the total cost of the car:

Calculate the amount of interest paid:

The interest is what percent of the price of the car?
5. You will put $1200 down on a car and want a 4 year loan. You could buy a new car for $15,000 (interest rate 6%) or the same model car that is 2 years old for $11,500 (interest rate 6.5%). The new car has a monthly payment of $305.31 and the used car has a monthly payment of $244.26. Explain what you would pick and why.
Class #3, Depreciation and Amortization

In this class, the concept of car depreciation is explored. The students will compare two similar model vehicles – a Chevrolet Impala and a Honda Accord. They will collect data about used car prices from Kelly Blue Books (online), and make a graph. They will interpret the graph and calculate depreciation rates. Lastly, (if they started depreciation last class, they will have time for this), the students will look at amortization charts and combine this with depreciation, and learn what it means to be upside down in their car payments.

After reviewing the homework, there is a quiz to check student understanding up to this point. Put the students in pairs and pass out the Depreciation handout. After they understand that, pass out Amortization. The students should be able to work through most of these handouts without much guidance. Pass out the homework.

Note: The values on Kelley Blue Book change daily, sometimes by several hundred dollars. The numbers the students come up with will be slightly different from the numbers you might have worked through on a different day. You do not need to use these particular vehicles - you could compare any two same class vehicles if you think the students might find that more interesting. The only thing to be careful of is to use a model that has been out for at least five years, so there is used car pricing data available.

Grading
A sample grade sheet could look like:
Stocks (10 points) _____
Depreciation packet (20 points) ______
Amortization packet (20 points) ______
Total (50 points) ______
1. Find the interest for a $5000 loan at 6.25% interest for 6 months.  Simple Interest = \( P \times R \times T \)

2. What is the new principal at the end of one year on a $10,000 loan? The interest rate is 8% and the loan is compounded quarterly.

\[
\begin{array}{ccc}
\text{Quarter} & I = P \times R \times T & \text{New Principal} \\
\end{array}
\]

3. As a general guideline, you should spend no more than 15% of your monthly take home pay on a car payment. What is the highest monthly car payment you should have if your take home pay is $1700 per month?

4. You want to buy a new car for $14,500 and will put $2000 down. You have a finance rate of 6% for 5 years.
   a. Find your monthly car payment (use bankrate.com): ____________
   b. Calculate the total cost of the car:
   c. Calculate the amount of interest paid:
   d. The interest is what percent of price of the car?
Depreciation

Every year, the car that you own gets one year older and is worth less money. Not all cars drop in value the same amount. We will compare the values of a Honda Accord and a Chevrolet Impala, both mid-size sedans. You can get pricing information from Kelly Blue Books:

We want to get the information to fill out the table on the next page. First, we need to find the price for these cars new. Go to www.kbb.com. Click on the New Cars tab. Select Honda, then Accord, for the car make and model. Click on Go. Click on 2007. You need to select the car’s trim line. A trim line is the set of options that you can get on a car. You can get a high trim line that will have extras like leather seats, navigation systems, etc. or, a lower trim line without these that will cost less. Scroll down and select the “4-door LX sedan w/o PZEV”, automatic transmission (this is a low trim line). (It will also say the engine is 4 cyl, VTEC, 2.4L, 166hp). Write the new car blue book value in the chart. (The other values are the MSRP price, which is the sticker price, or dealer asking price of the car, and the invoice price, or the price the dealer paid for the car. The blue book price is Kelly’s opinion of what you would realistically pay for the car, and is between the MSRP and invoice price.)

Click back to new cars and get the blue book price for the 2007 Chevrolet Impala, 4-door LS Sedan (it will also say automatic, V6, FFV, 3.5L, 211hp).

To fill out the rest of the chart, click on the Used Cars tab. After putting in 2006, Chevrolet, Impala, it will ask you to select either “trade in value”, “private party value”, or “suggested retail value”. Read what each one of these mean. Since the majority of people will sell their car to a dealer, select “trade in value”. This will tell you what the car is worth to you or, what you could realistically sell it for. Select the trim line we have selected “4-door LS Sedan”. Type in our zip code (03833) and use the mileage they suggest as typical. Do not change any of the equipment. Scroll down and click continue. Select the condition listed in the chart (excellent for 2006) and record the car’s value.
Fill out the rest of the chart. To save time, one person should find the Accord values, and the other person the Impala values.

<table>
<thead>
<tr>
<th></th>
<th>Chevrolet Impala</th>
<th>Honda Accord</th>
</tr>
</thead>
<tbody>
<tr>
<td>2007</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2006</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Condition: excellent</td>
<td>Miles: 18,000</td>
<td></td>
</tr>
<tr>
<td>2005</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Condition: excellent</td>
<td>Miles: 33,000</td>
<td></td>
</tr>
<tr>
<td>2004</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Condition: good</td>
<td>Miles: 47,000</td>
<td></td>
</tr>
<tr>
<td>2003</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Condition: good</td>
<td>Miles: 59,000</td>
<td></td>
</tr>
<tr>
<td>2002</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Condition: good</td>
<td>Miles: 67,000</td>
<td></td>
</tr>
</tbody>
</table>
1. Make a line graph. Put the year on the x axis, or the bottom. Spread it out so there are a few boxes between the years. Put the value of the car on the y axis. Put both cars on the same graph. Use circles for the Honda data points and small triangles for the Chevrolet data points.

2. What is depreciation?

3. Which vehicle experiences more depreciation? Why do you think this is?

4. During which year does the car experience the largest drop in value?

5. After the first year, how would you say the rate of depreciation of the Accord compares to the Impala – more, less, or about the same? Why did you give that answer?

6. Using the graph, estimate the value of a 2001 Accord _______, 2001 Impala______.

7. How much did the cars drop in value the first year? Accord_____ Impala_____

8. What percent drop in value is this? This is called the first year depreciation rate. Accord ___________ Impala
9. Calculate the second and third year depreciation rates.

<table>
<thead>
<tr>
<th>Car</th>
<th>Amount dropped in second year</th>
<th>Second year depreciation rate</th>
</tr>
</thead>
<tbody>
<tr>
<td>Accord</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Impala</td>
<td></td>
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<td></td>
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</tbody>
</table>
Amortization Charts

Each time you make a car payment, some of the money goes towards paying the interest on the loan, and some is applied to the principal (the principal is the money that you borrowed in the first place). The question is – how much goes towards each? This is all figured out through some rather complex formulas, and is (fortunately!) summarized in an amortization table.

Suppose you bought a new, 2007 Hyundai Accent, 2 door GS hatchback with automatic transmission. You paid the blue book value of $11,850. You put $500 down and will finance the rest over 5 years at 7.5%. Go to car payment calculator on bankrate.com. Enter the data, (remember to subtract your down payment from the $11,850), click on “Show/Recalculate Amortization Table”, and scroll down.

Notice the amortization chart. The top row, in grey, shows each month of your car payment. Underneath it shows how much your car payment went towards paying down the interest, and how much was applied towards the principle. Notice that the amounts are different every month (even though your car payment is the same).

1. What do you notice about the amount of money that is applied towards the interest each month?

2. What do you notice about the amount of money that is applied towards the principle each month?

3. What is your loan balance at the end of one year? ________
   What percent of the loan do you still owe at the end of one year?

   What is your loan balance at the end of two years? ________
   What percent of the loan do you still owe at the end of two years?

   What is your loan balance at the end of three years? ________
   What percent of the loan do you still owe at the end of three years?

   What is your loan balance at the end of four years? ________
What percent of the loan do you still owe at the end of four years?

What is your loan balance at the end of five years? ________
What percent of the loan do you still owe at the end of five years?

4. Graph this data on graph paper. The x axis is years, the y axis is the loan balance (not percent). On the x axis – have every 4th line be a year, and label the axis points “today, 1 year, 2 years” etc, to 5 years. Draw a line through the data points and notice this makes a straight line.

5. Next, we want to compare the amount that you owe on the loan, to the amount that you could sell your car for, as your car ages. Although no one knows the exact value your car will be in the future, it will not be too far off from the value of the today. Go to the Kelley Blue Book website (www.kbb.com). Go to used cars. Find the Trade In Value of the car. Enter the typical gas mileage given. Don’t forget to change the transmission to automatic!

2007  Hyundai Accent, 2 door, GS hatchback, automatic  excellent condition
2005  “   “   “  good condition
2004  “   “   “  good condition
2003  “   “   “  good condition
2002  “   “   “  fair condition
2001  “   “   “  fair condition

6. On the same graph that shows the loan balance, plot this data. Use small triangles for your data points (instead of circles) so you don’t get the points confused. The y axis is now the trade in value of the car. The 2007 value is x axis point “today”. The 2006 value is the x axis point “1 year” because in one year, your car will be one year old, and have roughly the same value as a one year old car today. The 2005 value will match 2 years, etc. Notice these points are not a nice, straight line.
7. What does this graph tell you?

8. The lines on the graph cross at one point. What does this point mean?

9. There is a term called “upside down in your car payment”. What do you think that means?

10. Under what circumstances would this be a problem?

11. What would you have to do if you did not want to be “upside down”? Go to bankrate.com and find a specific solution. Plot the third set of data points from your solution onto the same graph.
Homework

The following new and trade-in car values were taken from Kelly Blue Book. The Galant and Camry are mid-size sedans.

<table>
<thead>
<tr>
<th>Year</th>
<th>Mitsubishi Galant</th>
<th>Toyota Camry</th>
</tr>
</thead>
<tbody>
<tr>
<td>2007 (new)</td>
<td>$20,319</td>
<td>$19,133</td>
</tr>
<tr>
<td>2006</td>
<td>$10,225</td>
<td>$13,475</td>
</tr>
<tr>
<td></td>
<td>Condition: excellent</td>
<td>Miles: 18,000</td>
</tr>
<tr>
<td>2005</td>
<td>$8875</td>
<td>$11,800</td>
</tr>
<tr>
<td></td>
<td>Condition: excellent</td>
<td>Miles: 33,000</td>
</tr>
<tr>
<td>2004</td>
<td>$7320</td>
<td>$9710</td>
</tr>
<tr>
<td></td>
<td>Condition: good</td>
<td>Miles: 47,000</td>
</tr>
<tr>
<td>2003</td>
<td>$5270</td>
<td>$8690</td>
</tr>
<tr>
<td></td>
<td>Condition: good</td>
<td>Miles: 59,000</td>
</tr>
<tr>
<td>2002</td>
<td>$4445</td>
<td>$7415</td>
</tr>
<tr>
<td></td>
<td>Condition: good</td>
<td>Miles: 67,000</td>
</tr>
</tbody>
</table>

1. Make a line graph of the car values vs. the year, as we did in class. Put both cars on the same graph.

2. Using the graph, estimate the value of a 2001 Camry _______ and 2001 Galant ______.

3. How much do the cars drop in value the first year? Camry ______ Galant_______

4. What is the first year depreciation rate for each car?

5. What is the second year depreciation rate for each car?
6. What is an amortization chart?

7. You want to know if you are upside down in your car payments. What do you need to compare? (describe with words)
Answers

Quiz
1. $156.25  
2. $10,824.32  
3. $255  
4a. $241.66  
b. $16,499.60  
c. $199.60  
d. 13.8%

Depreciation handout
1. The numbers will vary on any given day, but the graph will look something like

2. Depreciation is that cars lose value over time (compared to houses which gain value over time).

3. Impala depreciates more because the Honda has a better reputation for high quality. The Impala is not perceived as being as reliable, and therefore as valuable, as the Honda. People are not willing to pay as much for a used Impala.

4. Impala, during the first year
5. about the same because the slopes are about equal
6. extrapolating the graph above, Accord about $8200 and Impala about $4100
7. accord $4570 and impala $8655
8. accord: \[
\frac{4570}{20370} = 22.4\% 
\]
   impala: \[
\frac{8008}{20683} = 40.1\% 
\]
9. accord: second year drop = $2100  
   \[
   \frac{2100}{15800} = 13.3\% 
\]
   Third year drop = $1475  
   \[
   \frac{1475}{13700} = 10.8\% 
\]
   Impala: second year drop = $1325  
   \[
   \frac{1325}{12675} = 10.4\% 
\]
   Third year drop = $1800  
   \[
   \frac{1800}{11350} = 15.6\% 
\]

Amortization handout
1. The amount of money put towards interest is a little less each month.
2. The amount of money put towards principal increases a little each month.
3. First year: 9406.16 or 82.9%; second year: 7311.42 or 62.4%; third year: 5054.06 or 48.1%; fourth year: 2621.46 or 23.1%; fifth year: 0 or 0%

4-6.

7. The graph tells you there are times when you will owe more for the car than you can sell the car for.

8. The point means that you can sell the car for the same amount that you owe on the car.

9. This means that the value of the car is less than the amount you owe on the car. You could not sell the car and get enough money to pay off your loan.

10. This would be a problem if you wanted (or needed) a different car or if your car was stolen or totaled in a car wreck. The insurance company reimburses according to the value of the car – not how much you owe on the car.

11. Answers will vary, but you either have to put more down on the car, or finance for a shorter amount of time (which means paying more each month), or both.

**Class #4 and 5**

Put the students in pairs and have them work on the following project. They can have all of class 4 to work on them, then finish and present in class 5.
Project

You need to buy a new (or used) car. You are 22 years old and have a net income of $1800 per month. You have $1100 in a savings account and can get $500 trade in for your present car. You have a B credit rating.

Find a car on the internet that you can afford. Do a google search – there are many websites that show cars for sale. Assume that you can lower the asking price of the vehicle by 3%. You must show this is a car that you can afford, according to the guidelines we have discussed in class. If you decide to go outside the financial guidelines, you must explain the financial risks involved and your reasons for doing so. Make a presentation to the class on poster board. You can present the material in any way and any order that makes sense.

Interest Rates

<table>
<thead>
<tr>
<th>Credit Score</th>
<th>A</th>
<th>B</th>
<th>C</th>
<th>D</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>6.1%</td>
<td>7.1%</td>
<td>10%</td>
<td>20%</td>
</tr>
</tbody>
</table>

These interest rates apply for new cars with a loan of up to 36 months. If you choose a used car, or a longer loan, adjust the interest rate according to the chart below:

<table>
<thead>
<tr>
<th></th>
<th>30-36 months</th>
<th>37-60 months</th>
<th>61-72 months</th>
</tr>
</thead>
<tbody>
<tr>
<td>New</td>
<td>add .25%</td>
<td>add .6%</td>
<td>add .6%</td>
</tr>
<tr>
<td>Used</td>
<td>add .6%</td>
<td>add .9%</td>
<td>add 1.4%</td>
</tr>
</tbody>
</table>

You will be graded as follows:
Grading Rubric

Total: 100 points

Basics

- Presentation is organized and easy to follow 15 points
- All calculations not done by the computer, are clearly shown 10 points
- Stated website, asking price of car, year and model of car 5 points
- Calculated negotiated price of car (minus 3%) 3 points
- Stated correct interest rate from table 3 points
- Stated amount to take from savings 3 points
- Stated total down payment (includes trade in) 3 points
- Stated length of loan 3 points
- Calculated monthly payment 3 points

Calculations

- Calculated amount of net income that should go to car payment according to financial guidelines 3 points
- Shows monthly payment is within financial guidelines 3 points
- Show if you are, or are not, upside down in car payments.
  - States car loan balance for each year of loan 5 points
  - States estimated depreciation of car for each year 5 points

Note: If it is a newer model car, there will not be used car values. Assume 20% depreciation in the first year and 12% depreciation for each year after that.

- Shows car loan balance and depreciation on a graph 10 points
- Calculates total spent on car after loan is paid off 5 points

Explanations

- Explain why bought a new or used car 7 points
- Explain why bought this particular car 7 points
- Explain why took that particular amount out from savings 7 points

If you do not meet financial guidelines

Note: These explanations only need to be done if you do not meet the financial guidelines. Since the total is already 100 points, you do not get more points for these explanations. You will lose points if you need to give these explanations, and you do not.

- If upside down in car payments, explain why you are doing this -10 points
- If monthly payment is more than 15% of your monthly income, explain why you are doing this -10 points