

Money Math for Teens

The True Cost of Owning a Car





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The True Cost of Owning a Car

Lesson Plan

OBJECTIVE

Students should thoroughly understand the true cost of purchasing and maintaining a car. The lesson emphasizes smart budgeting to cover expected and unexpected costs.

Students will be able to:

- ▶ Calculate their monthly payment based on financing options
- ▶ Estimate vehicle registration costs, title fees and sales tax
- ▶ Understand the need for and cost of car insurance
- ▶ Accurately determine and budget for common maintenance costs
- ▶ Estimate monthly fuel consumption and budget.

TEACHING MATERIALS

- ▶ Lesson plan with answer key for student assessment
- ▶ The True Cost of Owning a Car student handout
- ▶ Student assessment worksheet

LESSON ACTIVITY

1. Introduce the lesson.

- Ask students to create a list of costs they think come with owning a car.
- Write their responses on the board as a bulleted list.
- Ask the class to rank the costs from most expensive to least expensive.
- Ask which expenses are one-time costs and which are expenses that may not happen immediately, but need to be budgeted for.
- Ask for the crucial “must have” before buying a car.
 - Answer should be “a job.”
 - Ask how students will pay for a car without a job.

2. Introduce the student handout and begin a discussion of paying for a car (cash vs. financing and monthly payments).

- Ask students to read the first page up to Acquisition.
- Compare the list on the board with the costs mentioned in the handout.
 - Are any missing from their list?
 - Did they mention any not included in the handout?



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- Discuss the pros and cons of paying cash for a car versus financing the car.
 - The amount of time one has to save for a full-price purchase depends on the cost of the car and the amount he or she is able to save each month.
 - Discuss what a car buyer should do if a good deal comes along before he or she has saved enough money.
- Pages 8–9 of the handout discuss financing obstacles and opportunities.
 - A private deal purchase might be financed by a credit union lender. Discuss the limitations of using credit union financing:
 - Vehicles can't be too old.
 - A cosigner is needed if the buyer is under 18.
 - A 20% (or \$2,500) down payment is required, whichever is greater; how long would students have to save?
 - The car payment cannot exceed 40% of gross wages.
 - Point out that credit union financing offers much lower interest rates than do other forms of financing.
- Page 10 covers the formula for calculating a monthly car payment:

$$\text{Monthly Payment} = \frac{(P \times (I \div 12))}{(1 - (1 + (I \div 12))^{-N})}$$

Where:

P = Principal amount of the loan

I = Interest rate of the loan

N = Number of months to pay off the loan

- Work through the presented example.
- Make sure students know how to do a calculation with negative exponents:

$$a^{-N} = \frac{1}{a^N}$$

- There are three additional examples on page 10 for practice; answers are provided in the table.
- Point out that a monthly car payment is an obligation and therefore must be budgeted for and paid, every month, for the length of the loan.



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3. Discuss registration requirements and fees.

- Information presented is from the state of Florida. Most states follow the same or similar procedures, but be sure students realize they should check with their state's department of motor vehicles (DMV) for accurate local values, as costs may vary by state, or their state may do things differently.
- Pages 11–12 of the handout address how to estimate tag and title fees and taxes.
 - Of these fees, only the annual registration fee needs to be accounted for in the monthly budget.
 - All other fees are one-time costs and must be accounted for at the time of the purchase.

4. Discuss types of car insurance, related terms, and how to calculate the cost of insurance. Pages 13–17 introduce the basics.

- Students complete the example on page 17, using the formula provided.
 1. 20% of purchase = base cost
 2. Decrease base cost depending on vehicle age (see table in handout)
 3. Increase cost depending on driver's age
 4. Increase cost if the driver is male.

Solution:

Base cost of insurance = 20% of \$7,800 = $0.2 \times 7800 =$ **\$1,560**

Subtract 10% of base cost since car is 5 years old: $1560 - 156 =$ **\$1,404**

Age of driver (17) increases the premium by 3%: $1404 + 42.12 =$ **\$1,446.12**

No surcharge added because driver is female.

- Typically, initial insurance premiums cover a six-month period, so the result of the calculation should be divided by 2 and that figure used as the initial cost of purchase.
- The six-month cost should be divided by 6 to arrive at the monthly cost to be included in the budget.

Note: It's very important for students to understand that insurance companies use a complicated algorithm called the **CRI calculation** to determine the insurance premium for a particular vehicle owned by a particular driver. This algorithm can have more than 2,000 parameters. Each insurance company can set the weight of each parameter as it wishes. Therefore, it is not surprising that insurance premium quotes can vary greatly among insurance companies. For purposes of this lesson, we have simplified the calculation into a four-step process. This should not be assumed to be representative of actual insurance premium quotes.



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5. Discuss repairs and maintenance. Pages 18–20 of the handout introduce routine maintenance.

- Oil changes, tire rotations and replacements, and brakes are the most common needed services.
- Because car owners know these need to be done, they need to budget for them.
- A driver's habits can dramatically change the time frame for routine replacements.
 - If brakes, for example, last about 30,000 miles:
 - A driver who drives only 10,000 miles/year can budget the cost over three years.
 - A driver who drives 15,000 miles/year can budget the cost over two years.
 - Actual mileage between tire changes will vary based on maintenance and where the car is usually driven.
 - Rotating tires with every oil change can prolong tire life.
 - Highway driving generally allows for more mileage before tires require replacement than stop-and-go city traffic and driving on rough rural roads.

6. Discuss gas mileage and budgeting for gasoline (pages 20–21).

- Gas mileage estimates for a vehicle are calculated under ideal conditions. Individual drivers' results will vary, perhaps significantly.
- Gasoline costs have soared in recent years. For purposes of this lesson, we fix the price of gas at \$3.50/gallon.
- A budget for gasoline can be determined with a straightforward calculation:
 1. Estimate annual mileage (use 12,000 miles/year for this exercise).
 2. Divide by 12 to get monthly mileage.
 3. Divide by the car's gas mileage (use 22 mpg). This gives you the number of gallons required each month.
 4. Multiply by \$3.50 to arrive at the estimated monthly fuel cost.



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7. **Conclude the lesson with the culminating discussion of affordability (Can I Afford a Car?, pages 22–26). Students will locate and use the pertinent data presented in two examples to determine:**
 - The initial costs of purchasing a particular vehicle and getting it on the road
 - The ongoing costs of owning a car that must be accounted for when developing a car budget.
8. **Walk students through Scenario 1: Michael’s Toyota. Discuss all of the elements of a car budget:**
 - Financing and monthly payment
 - Annual registration fee, title fee and taxes
 - Insurance
 - Reiterate that the formula used should only be considered accurate for purposes of this lesson.
 - Maintenance and repairs
 - An oil change, tire replacement and brake pad replacement are typical upfront costs that can be added to the initial purchase cost.
 - Use the current mileage of the car to determine if there is an immediate need to replace tires and/or brake pads.
 - Estimated annual mileage determines how often tires and brake pads need to be replaced and the number of oil changes the vehicle will need each year.
 - Gas, based on estimated gas mileage and annual mileage.
9. **Work through the side-by-side cost analysis matrix for Scenario 1.**
 - The figures are prefilled. Ask students to verify that they arrive at the same results for each line item.
 - Ask students to answer the question “Can Michael afford this car?” by examining the total acquisition cost and monthly budget cells at the bottom of the matrix.
 - Does Michael have enough cash to cover the initial acquisition cost?
 - Does his income support the monthly budget estimate?



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10. For Scenario 2, students should do the same calculations and fill in the blank matrix provided to determine if Rebecca can afford the car she wants. Here are the correct figures:

Acquisition Costs		Monthly Costs	
Down payment	\$3,900.00	Car payment	\$378.94
Registration	\$1,557.10	Annual registration renewal	\$4.76
First six months of insurance	\$1,958.78	Insurance renewal	\$326.46
		Fuel	\$185.61
Repairs/replacements		Repairs/replacements	
Oil change	\$25.00	Oil changes (5/year)	\$10.42
Brake pads	\$200.00	Brake pads (2 years)	\$8.33
Tires (\$175 x 4)	\$700.00	Tires (2 years)	\$29.17
Total acquisition cost	\$8,340.88	Monthly budget	\$943.69

It looks like Rebecca should continue to look for a more affordable car.

11. Evaluate students' comprehension (see assessment worksheet).

- Allow students to use the lesson handout as a resource because the assessment uses formulas presented in the handout.

Assessment Answer Key

1. C
2. B
3. A
4. C
5. A
6. E
7. D
8. A
9. D
10. B



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Student Handout: The True Cost of Owning a Car

It won't come as any great shock that owning a car can be quite expensive. However, as you grow beyond your high school years, become more independent, get a job, save money and become a responsible young adult, you'll realize there is more to owning a car than buying the car, getting the keys, parking in the driveway and relying on your parents for unexpected expenses.

Buying your first car is a huge step toward independence, but independence comes with responsibilities. It's important to understand the true financial responsibility that comes with owning a car. There is the initial cost of acquisition—that is, buying the car. After that, you'll need to pay for maintenance, repairs, insurance and gas.

Sure, it's exciting to daydream about your first car and how cool you'll look driving it. But be realistic. Don't forget to ask yourself:

- ▶ How am I going to afford to buy a car?
- ▶ How much can I afford to spend?
- ▶ Will I need to finance the purchase?
- ▶ How much will the title, tax and registration cost?
- ▶ How much will insurance cost?
- ▶ How much will I pay monthly for gas?
- ▶ How often can I expect to have to change the oil, replace the battery or tires and do other routine maintenance?
- ▶ How will I pay for unexpected repairs?

If you already have a job, save money and have created and stuck to a budget, you're ahead of the game. But before you dive into buying a car, get a handle on exactly how it will impact your budget.

Acquisition

Let's start right at the beginning with acquisition—in other words, buying the car. Whether you plan to buy your first car from a neighbor, at a used car lot or straight from the showroom floor, expect to spend some serious cash.

Because the economy has been sluggish, the value of used cars has soared because people need to minimize costs whenever and wherever they can and may be more likely to hold onto their cars or buy used ones. Even your neighbor down the street won't be giving his or her old car away.

Used car dealers know that their products are in high demand, so price negotiation may be tough. And the used car market isn't the only one that's tight. Even with rebates and incentives, new car dealers are demanding high prices for new vehicles.



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Cash Purchase

If you are patient and disciplined enough to save the entire purchase price before buying a vehicle, that's great. Your persistence will pay off immediately because you'll avoid a monthly car payment and the interest charges that go with it. Don't forget that you'll need additional cash beyond the purchase price to cover fees and taxes. To make that car your own, you'll need to get a new title (proof of ownership) and pay for insurance, car registration and a license plate. These costs alone can total hundreds of dollars.

Financing a Purchase

Many people finance their car purchases, whether they buy from a neighbor in a private deal or off a car lot. This means that they make a down payment in cash and borrow the rest.

However, if you buy a car through a private deal, the seller isn't likely to finance the purchase for you. He or she wants to sell the car in exchange for cash. Financing a private deal purchase entails obtaining financing from a bank, credit union or other financial institution. This can be an obstacle for many first-time car buyers. In fact, obtaining financing from a dealer can also be a problem for first-time buyers. Here are a few of the barriers that you may encounter when trying to finance your first car:

- ▶ Lack of credit history is the biggest barrier. It is very difficult to get a car loan if you have a limited credit history or none at all.
- ▶ Interest rates charged on approved car loans for first-time buyers with little or no credit history can be quite high.
- ▶ Some lenders will require that your car payment not exceed 40% of your gross monthly income.
- ▶ Lenders won't approve car loans for vehicles more than five years old.
- ▶ Many lenders won't approve car loans for vehicles with more than 90,000 miles.
- ▶ There may be minimum finance limits; you may be denied a loan if you aren't asking to borrow enough money.
- ▶ Many lenders will not approve a loan to a buyer under age 18.
- ▶ Lenders may enforce a 20% equity position, which means you may have to make a down payment of no less than 20% of the purchase price.
- ▶ Lenders might deny a loan request if the vehicle lacks a CARFAX Report, or based on the contents of the report if it's available.
 - ▶ A **CARFAX Report** is a report that is the result of a records search on a vehicle. This report covers all insurance and law enforcement data entered about the vehicle. The data are accumulated based on the vehicle's Vehicle Identification Number (VIN).



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Getting Dealer Financing

Most car dealers have strict rules that determine whether they will finance a vehicle purchase. Here are some common guidelines.

- ▶ Minimum finance amount is \$7,000.
- ▶ No financing for a vehicle older than five years.
- ▶ No financing for a vehicle with more than 90,000 miles.
- ▶ Minimum age to obtain financing is 18.
 - ▶ Younger customers may apply for financing with a cosigner.
- ▶ Must put 10–20% of the purchase price down to create instant equity.
- ▶ A first-time buyer with little or no credit history will receive a higher auto loan rate. The better your credit, the better your interest rate.

Financing through a Credit Union

Credit unions offer another financing option, one that you could use to finance a private deal purchase. Credit unions differ from commercial banks because you must become a member before you can open an account or request a car loan. Interest rates offered by credit unions are traditionally much lower than those offered by dealers, but some of the same provisions still apply—for example, the better your credit, the better the interest rate you will receive.

- ▶ Financing may not be available for older vehicles.
- ▶ Loan term limits apply directly to the age of the car.
- ▶ Minimum age to obtain financing is 18.
 - ▶ Younger customers may apply for financing with a cosigner.
- ▶ A down payment of at least 20%, or \$2,500, is required, whichever is greater.
- ▶ Monthly car payment cannot exceed 40% of your gross monthly income.

Cash or Financing: What About My Budget?

If you can pay cash and finance nothing when buying a car, you'll do your monthly budget a huge favor. There won't be a car payment to factor into your monthly budget. There are plenty of other monthly budget items that come with owning a car, so removing the car payment itself would be helpful!

However, if you finance your purchase through a credit union or through a dealer, a car payment is inevitable. As we've seen already, there may be limits on financing in terms of the amount you are allowed to borrow and the length of the loan term. Once you've decided to finance, the amount of the loan, the length of the loan and the interest rate become the factors that determine your monthly car payment.



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Car payment calculators are available online and are easy to use and accurate. Or you can do the calculation yourself if you know three important pieces of information:

1. **Principal amount:** how much money you need to finance
2. **Interest rate:** the interest rate you will be charged for the loan
3. **Term in months:** how many months the loan will last.

The formula to calculate the monthly payment on an original principal loan amount (P) at an annual interest rate (I) that will be necessary to pay the entire loan off in N months looks complicated, but it's simple:

$$\text{Monthly Payment} = \frac{(P \times (I \div 12))}{(1 - (1 + (I \div 12))^{-N})}$$

Let's try it out.

A buyer wants to finance **\$25,000** toward an automobile at **6%** interest and pay off the loan entirely in **three years**.

$$P = 25000$$

$$I = 6\% = 0.06$$

$$N = 3 \text{ years} = 36 \text{ months}$$

Now, let's use the formula:

$$\begin{aligned} \text{Monthly Payment} &= \frac{(25000 \times (0.06 \div 12))}{(1 - (1 + (0.06 \div 12))^{-36})} = \frac{25000 \times 0.005}{(1 - (1 + 0.005)^{-36})} = \\ &= \frac{125}{(1 - (1.005)^{-36})} = \frac{125}{(1 - 0.83564)} = \frac{125}{0.16436} = \mathbf{\$760.53} \end{aligned}$$

The buyer's monthly payment will be **\$760.53**.

Here are more examples so you can check your math:

Amount Borrowed	Interest Rate	Term (Years)	Monthly Payment
\$7,000	8.2%	4	\$171.55
\$9,000	12%	4	\$237.01
\$11,000	16%	5	\$267.50

Remember, many of the lenders that approve car loans require a down payment of up to 20% of the purchase price. So, a \$16,000 purchase would require a \$3,200 down payment, and \$12,800 would be the amount financed.



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Tag, Title and Tax

Tag, title and tax are among the initial costs of purchasing a vehicle. Because these costs are almost immediate, many lenders will allow them to be rolled into the financing, or at least added to the purchase price when calculating the amount of the loan.

The **tag** is the license plate, which you receive after registering the vehicle with your state's department of motor vehicles (DMV). The **title** is the official document of ownership that proves you are the rightful owner of the car. You will use it to transfer ownership to another person if or when you sell the car. **Tax** is the amount charged by the state and local governments on the purchase price.

All 50 states charge a fee for registering a vehicle, but each state's fee may be different. We present an example of how a typical car registration would be calculated in the state of Florida.

The registration fee charged for a vehicle is based on the vehicle's weight in most states. For budgeting purposes, you can determine the registration fee for a vehicle you are planning to buy by finding out its weight and locating the appropriate entry in the following example table:

Classification	Weight	Annual Registration
Automobiles	Up to 2,499 lb.	\$46.15
Automobiles	2,500–3,499 lb.	\$57.15
Automobiles	3,500+ lb.	\$70.65
Trucks	Up to 1,999 lb.	\$46.15
Trucks	2,000–3,000 lb.	\$57.15
Trucks	3,001–5,000 lb.	\$70.65

In addition to the weight-based registration fee, additional fees will apply, depending on your situation:

Additional Fees	
Initial registration fee if the applicant does not have a Florida registration to transfer	\$225.00
Transfer of a license plate from another vehicle	\$7.35
New metal license plate	\$28.00
County mailing fee and branch fee	\$1.20



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Let's say you are a first-time buyer, with no previous plate and no prior registration, and are purchasing a 3,600 lb. car. You would pay:

70.65 annual registration fee
+ 1.20 county fee
+ 28.00 for a new metal plate
+ 225.00 for a new registration

= \$324.85 total

Renewing your registration for that vehicle would cost \$71.85: \$70.65 to the state and \$1.20 to the county branch office.

As far as monthly budgeting is concerned, the annual registration fee is the only number you will have to account for when creating your budget. The additional fees are one-time expenses.

Luckily, the title fee is one of those one-time expenses, so you don't need to budget for it every year. Here are sample title fees from Florida:

- ▶ New vehicle, no previous title: $77.25 + 0.50$ county branch fee = \$77.75
- ▶ Previously titled vehicle: $75.25 + 0.50$ county branch fee = \$75.75.

Tax due also is a one-time expense. Florida law, for example, requires sales tax to be collected on the full purchase price of a motor vehicle equal to 6% of that purchase price.

Let's look at an example. What would the tag, title and tax expenses be for the following vehicle?

A 2007 Honda Accord with automatic transmission and a six-cylinder engine, weighing 2,718 lb., purchased in Florida by a first-time car buyer for \$5,600 cash.

- Tag**
- ▶ \$57.15: Annual registration fee
 - ▶ \$225.00: Initial registration fee
 - ▶ \$28.00: New metal license plate
 - ▶ \$1.20: County mailing and branch fee

Title ▶ \$75.75: Previously titled vehicle fee, including county fee

Tax ▶ \$336.00: 6% sales tax

Total = \$723.10

An important note about registering a vehicle: You won't be allowed to register the vehicle without proof of insurance. We'll talk about insurance for your new car next.



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Car Insurance

Your state isn't the only entity that requires proof of insurance. Your lender, if you finance the purchase, also will require proof of insurance because you don't really own the car until the loan is paid off, and the lender doesn't want to get stuck with a wrecked car. In order to get a new car purchased, registered and in your driveway, you'll need car insurance.

There are three basic types of coverage that most people are familiar with, as well as extra options that are good to have. Some states may require some of the extra coverage options.

Basic Coverage

Liability: In an accident that is your fault, liability insurance pays for damage to the other vehicle and for medical claims made by people in the other car. Liability coverage is required in most states.

Collision: This pays for damage to your vehicle. Any cost to repair your car after an accident will be covered under collision insurance. Your lender will require this if you are financing your car.

Comprehensive: This pays for damage to your car that happens in ways other than an accident. Theft, vandalism, water damage and fire would come under comprehensive coverage.

Additional Coverage

Personal injury protection pays the medical costs for the policyholder and any passengers.

Uninsured/underinsured motorist coverage covers you and your car if you are involved in an accident with an uninsured or underinsured motorist.

Broken glass provides coverage if your collision or comprehensive policy does not cover the windows.

Guaranteed auto protection (GAP) insurance will pay the difference between your car's value and what you still owe on it should you drive right off the lot, hit a wall and destroy it. Remember, once you drive a new car off the lot, it is a used car and the value decreases.

Determining the coverage you need and coverage you should have will take time. There are several factors that affect how much insurance coverage will cost you.



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Cost Factors That Impact Insurance Rates

Here are some of the factors that will impact the final cost of car insurance for anyone, but most notably the new or young driver.

Deductible: When you file an insurance claim, the deductible is the amount of money you pay first before the insurance kicks in and pays the remaining costs of the claim. The higher you set your deductible, the lower your monthly insurance payment (known as your **premium**) will be.

Age: Younger, less experienced drivers pay much higher rates.

Gender: Males, especially young males, pay higher rates than females.

Demographics: Drivers who live in urban or high-crime areas pay higher premiums than those in rural or low-crime areas.

Claims: People who tend to have accidents or incur damage will pay higher premiums. If you have a minor accident, consider paying for the repair yourself and not filing an insurance claim. In the long run, the increase in your premium may mean that it is not worth filing a claim.

Traffic tickets: Getting a ticket for speeding, running a red light or any other moving violation will put points on your driver's license and increase your insurance premium. Obey the law!

Vehicle choice: Flashy, expensive cars cost a lot more to insure than cheaper cars. You may imagine yourself jetting around in a sports car, but look before you leap—can you afford the insurance?

Driving habits: The number of miles you put on your car each year, whether you drive to and from work and the distance between your home and work (commuting mileage) will be factors in determining your insurance premium.

Because there are a lot of factors that determine car insurance premiums, different people will receive different rates even if they are getting insurance for the same kind of car. People will receive different rate quotes for the same car by checking with different insurance companies. It pays to shop around by comparing companies and policies. The cost of insurance will be an important factor in your monthly budget, so be careful and choose wisely.

Budgeting for Car Insurance

We've seen that the actual cost of your car insurance will depend on many factors, including what kind of car you buy, how old you are, your gender and your driving record. There are too many personalized factors involved to accurately estimate what your monthly car insurance bill will be. You really need to research companies and rates and sit down with an insurance agent, even before you go out looking for that first car. Be sure to ask about discounts—they may be offered for students with good grades and to young drivers who take a safe driving course.



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Insurance companies generally quote annual rates, but policies typically renew every six months. This allows the insurance company to make any necessary adjustments if factors have changed—for example, you had an accident or accumulated several moving violations (these would cause your rate to increase), or you had a birthday (this would cause your rate to decrease).

Your insurance company may allow you to pay your premium in full at renewal, quarterly, or even monthly. Service charges or interest may be added if you don't pay the entire premium in one lump sum. Regardless of the payment cycle you choose, monthly budgeting for insurance is a must. Your policy will be up for renewal every six months, so you must have money available to keep your insurance in effect, or your policy will expire.

Although we can't accurately predict what your costs will be, one thing is certain: Your insurance premium will be a significant part of your monthly budget. This cost must be taken into account before you decide if you can afford the car you want.

For purposes of this lesson, we've developed a formula to come up with an estimate for the cost of car insurance based on a few parameters. This will allow us to "put a number" on insurance costs so we can go about budgeting for it. This formula should only be considered valid for purposes of this lesson; your actual costs might be quite different.

Car Insurance Estimation Formula

To estimate the cost of car insurance for this lesson, we will use a multistep formula. The formula takes into account:

1. The value of the car
2. The age of the car
3. The age of the driver
4. The gender of the driver.

The actual formula used by insurance companies is based on many more factors, but this formula will allow you to arrive at a ballpark estimate.

Step 1 of 4

To begin, we will calculate a base cost. The base cost will be 20% of the purchase price of the car.

Purchase Price	Base Cost of Insurance (20%)
\$8,400	\$1,680
\$12,000	\$2,400
\$10,250	\$2,050
\$9,500	\$1,900



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Step 2 of 4

We'll subtract 2% of the base cost for every year of the car's age.

Year of Car	Subtract from Base Cost
2014	0%
2013	2%
2012	4%
2011	6%
2010	8%
2009	10%

Example >>>

If the purchase price is \$12,000 and the base cost is \$2,400, adjust the base cost as follows:

Year of Car	Subtract from Base Cost	New Value
2014	0% = \$0	$2400 - 0 = \$2,400$
2013	2% = \$48	$2400 - 48 = \$2,352$
2012	4% = \$96	$2400 - 96 = \$2,304$
2011	6% = \$144	$2400 - 144 = \$2,256$
2010	8% = \$192	$2400 - 192 = \$2,208$
2009	10% = \$240	$2400 - 240 = \$2,160$

Step 3 of 4

Then, we'll increase that new value by a percentage based on the age of the driver:

Driver's Age	Increase Value By
21	1%
20	1.5%
19	2%
18	2.5%
17	3%
16	3.5%



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Step 4 of 4

Finally, a 4% surcharge will be added to the cost if the driver is male.

The complete four-step process is illustrated in the following example.

Use the formula to estimate the insurance cost for a 2011 Acura that costs **\$16,000**. The insured person is an 18-year-old male driver.

1. Base cost = 20% of \$16,000 = $0.20 \times 16,000 =$ **\$3,200**
2. Subtract 6% of the base cost since the car is a 2011 model:
6% of \$3,200 = $0.06 \times 3,200 =$ **\$192**
 $3,200 - 192 =$ **\$3,008**
3. The age of the driver (18) increases the premium by 2.5% (see age table above):
2.5% of \$3,008 = $0.025 \times 3,008 =$ **\$75.20**
 $3,008 + 75.20 =$ **\$3,083.20**
4. 4% surcharge added for male drivers:
4% of \$3,083.20 = $0.04 \times 3,083.20 =$ **\$123.33**
 $3,083.20 + 123.33 =$ **\$3,206.53**

Estimated annual insurance premium: **\$3,206.53**

Estimated six-month renewal premium: **\$1,603.27**

Monthly budget: **\$267.21**

Now, you try it:

Use the formula to estimate the insurance cost for a 2009 Toyota that costs \$7,800. The insured person is a 17-year-old female driver.

Did you get **\$1,446.12** as the estimated annual insurance premium?



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Repairs and Maintenance

Oil Changes, Tire Rotation and Brake Inspection

The most important maintenance you can do to keep your ride running smoothly is to keep up with oil changes. This should be done every 3,000 miles to keep your engine free of deposits and help it last longer.

Oil changes can cost \$25 or more. Since the average driver drives 12,000–15,000 miles each year, you should expect to get four to five oil changes per year. Budget **\$125** each year for oil changes.

Also, have your tires rotated and brakes inspected with every oil change. Rotating the tires will help them last longer by varying a wear pattern that might develop from leaving the same tire on the same wheel for too long.

Brake Maintenance

We won't insult your intelligence by telling you how important your car's brakes are to your safety.

There are two sets of brakes on your car: front and rear brakes. Each time you apply the brakes, the brake pads squeeze against the rotor to create friction and slow the car to a halt.

How often your car will need its brake pads replaced is a function of usage, not mileage. The more you use the brakes, the more they wear down. Consider this: Two drivers each put 3,000 miles on their cars. One driver does it on a round-trip drive from Florida to Virginia, mostly on highways. The other driver puts on the 3,000 miles by using his car to deliver papers on his paper route. Which driver will need brakes sooner?

Ignoring worn brake pads will cause metal-on-metal friction and wear out the brake drums. This repair will be more costly than a simple replacement, so have your brake pads inspected with each oil change, as recommended above, and replace them when necessary. The average cost to replace worn brake pads is \$100 for each end of the car. The average cost to resurface rotors and drums is \$150 for each end. You will also need new brake pads if you get the rotors and drums repaired, so count on an average cost of **\$250 per end** for this repair.

With average usage and a mix of highway and city driving, brake pads should be replaced about every 30,000 miles.



The True Cost of Owning a Car

Other Common Maintenance Services

Tire alignment ensures your tires are running straight. Misaligned tires will wear unevenly and have a shorter lifespan. You should have your tires aligned if you notice your car drifting as you drive. There is no prescribed mileage guideline for getting tires aligned. Even new tires can get out of alignment if you hit a curb or drive on rough roads with potholes. The average cost for this service is **\$80**.

A **tune-up** is done when your engine seems to be running “rough,” you notice a lack of power or the engine just doesn’t feel right. Rough running is not really a function of mileage; engines can begin to run rough if they are using old gasoline or gasoline with condensation. Water in the fuel line will make the engine sputter. Old gasoline also can cause deposits to build up on the spark plugs, hinder your car’s performance and decrease your gas mileage.

Some engines are more time consuming to work on, especially in some newer cars. Expect a bill for \$80, plus one to four hours of labor. At \$50/hour for labor, expect this service to cost you **\$130–\$280**.

We all hope that we won’t have to pay for **unexpected repairs**, but we can’t always avoid them. Flat tires, a squeaky belt, an oil or power steering fluid leak or a broken water pump are all common. While we can never predict when we might need one of these repairs, we can expect that something probably will go wrong during the year, so smart car owners budget “something” each month for unexpected repairs. Ignoring this budget item could mean getting stuck with a bill you are not prepared to pay.

Tires

Keeping your tires properly inflated will prolong their useful life, cut down on unnecessary wear and tear and improve your gas mileage. Well-maintained tires also help keep you safe: Worn, cracked or underinflated tires can lead to a serious loss of control, especially on slick, wet or snowy roads.

Some tire brands are known for performance, not longevity, or vice versa. Selecting tires for your car will be based on personal preference and your budget.

Before we present average price estimates for various vehicle types, a few exceptions should be noted. First, we don’t quote the price of tires for luxury vehicles here. Cars made by BMW, Mercedes, Jaguar and other luxury brands typically take different size tires at the front and rear, so purchasing tires for these cars is a bit more complicated—and expensive, at around \$300 per tire. (First-time car buyers will find out about these special requirements eventually, should they find themselves considering a luxury vehicle. Tires for Rolls Royce vehicles top out at \$1,500 per tire!)



The True Cost of Owning a Car

Body Style	Examples	Avg. Cost Per Tire	Avg. Expected Mileage
Economy/Subcompact	Toyota Corolla Honda Civic Mazda 323	\$100	25,000
Midsized	Toyota Camry Ford Fusion Ford Taurus	\$150–\$200	25,000
Full size	Cadillac Crown Victoria	\$150–\$200	25,000
Truck	Ford F150 Jeep Most SUVs	\$200	25,000

Tires are rated for expected mileage, such as 40,000 or 60,000 miles. The average life of most tires is about 25,000 miles, but a tire's actual lifespan will vary depending on your driving habits. Highway mileage puts more wear on tires than stop-and-go traffic in town. Rotating your tires each time you change the oil will help them last longer and allow you to go longer between replacements.

Gas

The price of gasoline has soared in recent years. This price increase has had a profound impact on our national economy and on the global economy as a whole. So it should come as no surprise that it has had a significant impact on the average person's monthly budget, and it will absolutely have an impact on yours.

Gas mileage is a hot topic when it comes to choosing a car. Many people are selecting smaller cars with smaller engines so they can get more miles per gallon (mpg) and reduce what they spend on gas. Of course, small four-cylinder engines are less powerful. Some people opt for larger, eight-cylinder engines because they prefer the power.

Automobile manufacturers test and predict a car's estimated gas mileage and print it right on its showroom sticker. Of course, the fine print always includes a disclaimer that "actual mileage may vary." And it absolutely will. You see, gas mileage estimates are based on "ideal conditions." You can expect to get the stated gas mileage only when driving:

- ▶ On flat, dry roads
- ▶ With no wind
- ▶ On highways at a constant speed
- ▶ With a perfectly tuned engine
- ▶ With perfectly inflated tires.



The True Cost of Owning a Car

It should come as no surprise that since you will rarely drive under “ideal conditions,” your actual gas mileage will probably be lower than advertised. Stop-and-go city driving, waiting at red lights and constant acceleration and deceleration will affect your gas mileage.

We came up with more realistic ranges of gas mileage, based on engine size. These estimates are just that; your mileage may vary.

Four-Cylinder	Six-Cylinder	Eight-Cylinder
21–28 mpg	14–20 mpg	9–13 mpg

You must pay attention to your gas consumption and budget for it if you are going to own a car. For our purposes, we’ll fix the cost of a gallon of gasoline at \$3.50. The actual price fluctuates, of course, sometimes changing multiple times during a single day, but for budgeting purposes, \$3.50/gallon is not an unreasonable estimate.

Budgeting for gas can be done with relatively easy mathematics. Adjusting your driving habits to optimize your mileage and control your costs is a bit more challenging.

For example, let’s say your car’s gas tank holds 15 gallons, and right now it is bone dry. That means it will cost $15 \times 3.50 = \$52.50$ to fill up.

How long will that tank of gas last you? If you are driving a four-cylinder car that gets an average of 25 mpg, then you should get 375 miles of driving from that tank of gas. A six-cylinder car that gets 15 mpg will let you go 225 miles, and an eight-cylinder gas guzzler that gets a paltry 10 mpg gets you 150 miles.

Now, what are your driving habits?

The average driver puts 12,000–15,000 miles on a car each year, or 1,000–1,250 miles on average per month.

- ▶ If you drive 1,000 miles each month and get 10 mpg, you’ll burn through 100 gallons of gas per month \times \$3.50/gallon = **\$350/month.**
- ▶ If you drive 1,000 miles each month and get 15 mpg, you’ll burn through 67 gallons of gas per month \times \$3.50/gallon = **\$234.50/month.**
- ▶ If you drive 1,000 miles each month and get 25 mpg, you’ll burn through 40 gallons of gas per month \times \$3.50/gallon = **\$140/month.**



The True Cost of Owning a Car

Can I Afford a Car?

There's a lot that goes into buying a car and keeping it running well. Before you decide to buy one, ask yourself these questions:

- ▶ What can I afford to buy?
- ▶ What can I afford to keep?
- ▶ Will I save for the entire purchase price or finance part of it?
- ▶ What will my initial costs be?
- ▶ Does my budget have room for a car payment?
- ▶ How much will insurance be? Will I pay for it monthly?
- ▶ What should I budget for repairs and maintenance?
- ▶ What can I expect my monthly gas bill to be?

If you're honest and realistic, the answer to "Can I afford a car?" will be clear.

Scenario 1: Michael's Toyota

Michael is a 17-year-old male student. He has a part-time job where he earns \$10/hour. He typically puts in about 26 hours each week, grossing him \$260/week or \$1,040/month. He has been saving to buy his first car. To date, Michael has saved \$4,500 toward that goal, and he has started looking at cars. Michael is a sensible, responsible young man and realizes he needs to make a prudent purchase. He is looking for something economical, dependable—and maybe a bit flashy.

After looking around for a while, Michael finds a private deal on a 2011 Toyota Corolla CE four-door sedan that is a sharp silver color. It has an automatic transmission; four cylinders; air conditioning; power windows, mirrors and locks; cruise control and a CD player. He has looked at it twice. It appears to be in excellent condition, has 33,000 miles, weighs 2,530 lb., and gets 25 mpg in the city, according to the current owner.

According to the Kelley Blue Book, the value of this car is \$12,616. Michael thinks he has found a good deal because he has negotiated a price of \$9,500 with the owner.

Can Michael afford this car?



The True Cost of Owning a Car

Analysis

Because the purchase price is \$5,000 more than Michael has saved, he'll have to finance the purchase. He visits his local credit union and learns:

- ▶ He has built good, although limited, credit.
- ▶ Because of his age, he'll need a cosigner, but his mom knows what a responsible, hardworking young man he is and is willing to cosign the loan.
- ▶ Based on the age of the car, he'll be able to get up to five years (60 months) of financing.
- ▶ His credit is good enough for him to get an interest rate of 8.1%.
- ▶ He'll need to make a 20% down payment (\$1,900).
- ▶ His monthly payment cannot exceed 40% of his gross monthly income. His part-time job (26 hours/week) at \$10/hour grosses him \$260/week or \$1,040/month, so the limit for his car payment is \$416/month.

Based on the purchase price of **\$9,500** and a **20%** down payment of **\$1,900**, Michael calculates his monthly car payment:

$$P = 7600 \quad (9500 - 1900)$$

$$I = 8.1\% = 0.081$$

$$N = 60 \text{ months}$$

$$\text{Monthly Payment} = \frac{(P \times (I \div 12))}{(1 - (1 + (I \div 12))^{-N})} = \frac{(76000 \times (0.081 \div 12))}{(1 - (1 + (0.081 \div 12))^{-60})} =$$

$$\frac{(76000 \times 0.00675)}{(1 - (1 + 0.00675)^{-60})} = \frac{51.3}{(1 - (1.00675)^{-60})} = \frac{51.3}{(1 - 0.667885)} =$$

$$\frac{51.3}{0.332115} = \mathbf{\$154.46}$$

Michael's monthly car payment will be **\$154.46**, well below 40% of his gross wages (\$416/month). It appears that Michael can finance this car.

His monthly car budget is currently **\$154.46**.



The True Cost of Owning a Car

Michael calculates his registration costs:

The car weighs 2,530 lb. His annual registration fee will be:	57.15
As a first-time buyer with no prior registration, Michael will pay:	225.00
His brand-new plate will cost:	28.00
He'll also pay the county fee:	1.20
Totaling:	311.35
This is a used car, so his title (including a county fee) will cost:	75.75
Sales tax of 6% of \$9,500 will equal:	<u>570.00</u>
Total registration costs:	\$957.10

Michael will have to pay the \$57.15 annual registration fee every year, so he adds it to his budget: $\$57.15/12 \text{ months} = \mathbf{\$4.76/\text{month}}$. His monthly car budget now stands at **\$159.22**.

The initial total registration costs, \$957.10, will be added to his \$1,900 down payment. Michael has now spent **\$2,857.10** of the \$4,500 he has saved.

Michael calculates his insurance premium:

1. 20% of \$9,500 = $0.2 \times 9500 = \$1,900$
2. The car is three years old, so subtract 6% of this amount: $1900 - 114 = \$1,786$
3. Michael is 17 years old, so add 3% of this amount: $1786 + 53.58 = \$1,839.58$
4. Add 4% to this amount because Michael is male: $1839.58 + 73.58 = \mathbf{\$1,913.16/\text{year}}$.

His insurance premium will be **\$956.58** every six months. Michael will pay the entire six-month premium up front. Including his down payment, registration costs and insurance premium, Michael has spent \$3,813.68 of the \$4,500 he has saved, leaving him with **\$686.32**.

He adds **\$159.43/month** to his budget to cover his insurance renewal in six months. His monthly budget stands at **\$318.65**.

Michael considers maintenance:

Now that Michael has the car, the first order of business is to get its oil changed. Because the car already has 33,000 miles on it, the brakes could use a good inspection. New front and rear brake pads will cost \$200 and should last almost three years before he will need to budget the money for another set. A set of four brand-new tires would cost \$400, but then he'd have about two years to budget for another set.

He decides to spend \$25 on an oil change, \$200 on brake pads, and \$400 on tires right up front to be sure his new ride is in tip-top condition. That's **\$625** out of the \$686.32 he has left, leaving him **\$61.32**.



The True Cost of Owning a Car

Michael adjusts his monthly budget:

- ▶ Four \$25 oil changes during the year: $25 \times 4 = 100/12 = \mathbf{\$8.33/month}$
- ▶ \$200 for brake pads 36 months from now = $200/36 = \mathbf{\$5.56/month}$
- ▶ \$400 for tires 24 months from now = $400/24 = \mathbf{\$16.67/month}$.

This will add an additional **\$30.56/month** to his monthly budget, bringing it to **\$349.21**.

Finally, Michael estimates his fuel costs:

An average driver puts 12,000–15,000 miles on his or her car each year. Michael believes he will drive more than average but on the lower end of that range. He estimates he will drive 13,000 miles/year, or 1,083 miles/month. If his Corolla gets the 25 mpg that the current owner claims it does, he can expect to spend: $1083/25 \approx 44$ gallons/month $\times 3.50/\text{gallon} = \mathbf{\$154/month}$ for fuel.

Michael's total monthly car budget is **\$503.21**.

Well, can Michael afford this car?

Acquisition Costs		Monthly Costs	
Down payment	\$1,900.00	Car payment	\$154.46
Registration	\$957.10	Annual registration renewal	$57.15/12 = \$4.76$
First six months of insurance	\$956.58	Insurance renewal	\$159.43
Oil change, brakes, tires	\$625.00	Oil changes	\$8.33
		Brakes (36 months)	\$5.56
		Tires (24 months)	\$16.67
		Fuel	\$154.00
Total acquisition cost	\$4,438.68	Monthly budget	\$503.21

Michael has saved for this day. He has \$4,500 saved to cover the \$4,438.68 it will take to buy the car and make it road ready. His gross monthly salary is \$1,040, of which \$503.21 will be budgeted for the car. He'll spend $503.21/1040 = 0.484 = 48\%$ of his income on the car each month.

Michael has been working and saving to own this car, and he will need 48% of his income to keep it. So yes, Michael can afford this car.



The True Cost of Owning a Car

Scenario 2: Rebecca's Volkswagen—Now You Try

Rebecca is an 18-year-old female high school student set to graduate soon. She is preparing to go to college next fall, and purchasing her first car is one of the first steps toward some really big, exciting changes in her life.

She has held a part-time job at the supermarket for several years. She now earns \$12/hour and typically puts in about 30 hours/week, grossing her \$360/week or \$1,440/month. She has shown good financial judgment in the past, so her credit is good enough to get her a 7.74% interest rate on a car loan for up to 72 months. However, Rebecca wants to pay off the car completely by the time she graduates college, so she will only request a four-year loan.

To date, Rebecca has saved \$5,100 toward her car purchase. She also saves \$200/month for college expenses. She knows the apartment she will live in at school will cost \$550/month, so she needs to stay within a budget.

After looking around for a while, Rebecca has found what she thinks is a good deal on a 2010 Volkswagen Passat 2.5L SE that is a sharp glacier blue color. It has an automatic transmission; 170 horsepower; five cylinders; air conditioning; a sunroof; power windows, mirrors and locks; cruise control and a CD player.

The car is in “like new” condition, has 28,500 miles, weighs 3,220 lb., and gets 22 mpg city, according to the current owner. Good mileage is important to Rebecca. She expects to make several trips back home during the school year, and she estimates she will put 14,000 miles/year on the car. Rebecca researches the car and finds its Kelley Blue Book value to be \$25,616. She thinks she’s found a good deal because she has negotiated a price of \$19,500 with the owner.

Can Rebecca afford this car? Complete the following table to find out.

Acquisition Costs		Monthly Costs	
Down payment		Car payment	
Registration		Annual registration renewal	
First six months of insurance		Insurance renewal	
		Fuel	
Repairs/replacements		Repairs/replacements	
Total acquisition cost		Monthly budget	



The True Cost of Owning a Car

Glossary of Terms

- ▶ **CARFAX Report:** The result of a records search about a vehicle. This report covers all insurance and law enforcement data entered about the vehicle since it was new. The data are accumulated based on the Vehicle Identification Number (VIN).
- ▶ **Car payment:** A monthly payment to a lender to repay a borrowed amount, with interest, over a specific term.
- ▶ **Cosigner:** Usually a parent or other responsible adult who agrees to assume responsibility for a debt if the borrower defaults on the debt.
- ▶ **Credit history:** The accumulated record of credit that an individual has built over time.
- ▶ **Deductible:** The amount of an insurance claim that the insured person must pay before the insurance company pays the remaining costs.
- ▶ **Department of motor vehicles (DMV):** A government agency that regulates driver's licenses and automobile registration.
- ▶ **Down payment:** An initial amount, usually a percentage of a total cost, that is paid by a borrower to create equity in a purchase.
- ▶ **Equity position:** The amount of ownership, expressed as a percentage, that a borrower holds in a financed item.
- ▶ **Gross monthly income:** A person's total income each month before any deductions, such as taxes, are taken out.
- ▶ **Kelley Blue Book:** The best-known vehicle valuation resource available to consumers. It is a publication meant to help buyers and sellers put a cash value on automobiles.
- ▶ **Miles per gallon (MPG):** A measurement of how far a vehicle can travel on one gallon of gasoline.
- ▶ **Premium:** This is the cost of insurance. A periodic payment on an insurance policy is called the **insurance premium**.
- ▶ **Principal:** The initial amount borrowed on a loan.
- ▶ **Proof of insurance:** Any type of documentation that a person can provide to another individual or government agency to show that he or she currently has valid insurance.
- ▶ **Registration:** An annual fee charged by a state to a vehicle owner for the right to drive that vehicle and to use the state's license plate.
- ▶ **Title:** The official document that proves a vehicle owner's rightful ownership.
- ▶ **Vehicle Identification Number (VIN):** A unique, original code assigned to a vehicle that includes a serial number.



The True Cost of Owning a Car

Special Thanks

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- ▶ Brake World: 1213 N. State Rd 7, Royal Palm Beach, FL 33411
- ▶ Martino Tire: 1213-1 N State Rd 7, Royal Palm Beach, FL 33411
- ▶ First Choice Credit Union: 11957 Southern Blvd, Royal Palm Beach, FL 33411
- ▶ Royal Palm Toyota: 9205 Southern Blvd, Royal Palm Beach, FL 33411
- ▶ CarBuyingTips.com: www.carbuyingtips.com/first-time-buyer.htm
- ▶ Edmunds: www.edmunds.com/car-buying/true-cost-to-own-tco.html
- ▶ Investopedia: www.investopedia.com/articles/pf/08/cost-car-ownership.asp
- ▶ Department of Highway Safety and Motor Vehicles, State of Florida: 2900 Apalachee Parkway, Neil Kirkman Building, Tallahassee, FL 32399-0620



Name _____

Date _____

Assessment: The True Cost of Owning a Car

1. Mike wants to purchase an \$11,350 car with a loan from a credit union that requires a 20% down payment. What amount will Mike borrow from the credit union?
 - A. \$2,270
 - B. \$13,620
 - C. \$9,080
 - D. \$10,215
2. What is usually the biggest barrier that young first-time car buyers encounter when trying to get approved for financing for a vehicle purchase?
 - A. High interest rates
 - B. Lack of credit history
 - C. Down payment requirements
 - D. Excessive mileage on the car
3. What would the monthly payment be on an \$8,600 car loan at 8.85% interest for a five-year term?
 - A. \$177.90
 - B. \$213.40
 - C. \$174.38
 - D. \$209.95
4. Which legal document proves the rightful owner of a vehicle?
 - A. Vehicle Identification Number (VIN)
 - B. Vehicle registration
 - C. Title
 - D. Bill of sale
5. Jason has a fender bender and needs repairs to his car that total \$3,228. Jason pays \$500 and his insurance company pays the remaining \$2,728. The term used to describe Jason's \$500 payment is:
 - A. Deductible
 - B. Premium
 - C. Contribution
 - D. Liability



Name _____

Date _____

6. Which of the following factors will affect your vehicle insurance premium each month?
 - A. Your age
 - B. Your gender
 - C. Getting a speeding ticket
 - D. The value of your car
 - E. All of the above

7. You have a six-cylinder, automatic pickup truck that gets 15 miles per gallon, and last year you drove 16,200 miles. What was your average monthly fuel bill last year, assuming a fuel price of \$3.50/gallon?
 - A. \$385.71
 - B. \$4,725.00
 - C. \$90.00
 - D. \$315.00

8. Which of the following costs would not be included in your monthly budget if you are financing a car purchase?
 - A. Title fee
 - B. Registration fee
 - C. Fuel cost
 - D. Insurance premium
 - E. Car payment



Name _____

Date _____

Challenge Questions

9. Carol purchases a used car from a dealer. The purchase price is \$8,725, and the dealer will finance the purchase at 9.21% interest for five years with a 20% down payment. When Carol pays off the loan, what will be the true purchase price of her car?
- A. \$8,736.60
 - B. \$6,980.00
 - C. \$1,745.00
 - D. \$10,481.60
10. Ben is purchasing a car from a dealership. He will be financing \$9,200. The dealer offers Ben a 12% interest rate on a four-year loan or a 10.5% interest rate on a six-year loan. The six-year loan will help Ben fit the car payment into his monthly budget. Depending on the loan he chooses, how much more will the car cost Ben?
- A. \$11,628.96 more if he chooses the four-year loan
 - B. \$810.48 more if he chooses the six-year loan
 - C. \$172.77 more if he chooses the six-year loan
 - D. \$242.27 more if he chooses the four-year loan