

**GRADE 12 ESSENTIAL
UNIT B – VEHICLE FINANCE
CLASS NOTES**

INTRODUCTION

1. Many people are likely to acquire a car at some time in their lifetime. This unit is designed to cover many of the considerations in getting a car.

The same principles apply to motorcycles and other motorized vehicles.

Caution

2. Many of the calculations and examples in these notes are *notional*, that is to say, they represent the general idea(s) not necessarily the hard and fast ‘rules’ of vehicle purchasing. As you are likely aware the way in which any products are sold is so dynamic and diverse that no two companies will sell the same way and no two customer experiences will be the same.

Taxes. The above caution is especially true with regards to the taxes and the array of forms and fees which are regularly changing in the industry or that regularly change with government policy. For example, the Provincial Sales Tax in Manitoba has gone from 6% to 8% and back down to 6% from the 1990’s till recently.

These notes are certainly not representative of actual tax policy; there is an army of bureaucrats (government office workers) that administer these processes and even they barely understand the entire system it seems.

3. You will need to be proficient with using percents and decimals to readily succeed in this unit.

VEHICLE PURCHASE CONSIDERATIONS

4. There are lots of things to consider when looking for a vehicle. New or Used? Buy or lease? Fuel consumption/economy. Taxes. Trade-ins. Insurance. Depreciation. Maintenance and repair. Financing.

6. There are several ways that you can purchase a vehicle.

People who buy new vehicles often purchase them from a dealership but you can buy them on-line either through a dealership or a car broker. You can also buy a used vehicle privately (Kijiji for example) from someone who wants to sell their vehicle. For each scenario, the amount you pay may be calculated differently.

7. Buying from a car dealer [Ford, GM, ..], new or used has some possible advantages and disadvantages. Can you think of a few and list them below? Watch a movie in our playlist or do your own query on the internet.

Buy from a Dealership	
Advantage	Disadvantage
New → warranty	New → Cost lots more!

8. Buying privately from an individual has some advantages and disadvantages; can you list a few? Watch a movie in our playlist or do your own query on the internet.

Buy Privately	
Advantage	Disadvantage

Purchasing a Vehicle (New or Used)

10. Before you purchase a vehicle, you must decide how you will pay for the vehicle. Most people make a loan – either at the automobile dealership or at a bank – to pay for their vehicle. If you have saved up enough money, it is also possible to “pay cash” for the vehicle, which means that you use your own money to pay the total cost of the vehicle at the time of purchase.

When you purchase a vehicle, you pay for its entire cost. You can drive the vehicle as often and as much as you want. Also, once you have paid for the vehicle, you own it and are free to sell or trade it whenever you wish.

Purchasing a vehicle is different than **leasing** a vehicle.

Of course, if you purchase a vehicle privately (eg: on Kijiji) the seller will want a full cash payment at the time of sale.

Taxes on Used Vehicles

11. If you buy a used vehicle privately you will not pay PST or GST to the owner that you purchase the vehicle from. You will however have to pay the PST, not GST, when you register the vehicle in your name. There are all kinds of ways that people try to get around this, such as saying it was a gift. But be aware that this is fraud and you won't be able to get around paying taxes that easily. For example, if someone gives a bill of sale for \$100 on a car that is clearly worth \$10 000, when they register the vehicle, they will be charged PST on the **book value** of the vehicle. The only exception is gifting a vehicle by a family member. Manitoba Public Insurance Corporation (MPIC) has very specific rules about who qualifies as "family".

Another thing you need to be aware of is that taxes are calculated differently from province to province. Also, if you buy a vehicle from another province and then register it in Manitoba, you will not have to pay the PST. As you can see taxes and how they are applied is a tricky thing.

12. **Trade-in Allowance.** If you already own a vehicle, you may want to use your old vehicle as part of the payment for the new one. A dealer may give you a trade-in allowance if you decide to trade your older vehicle for a newer one. For example, the dealer may decide that your current vehicle has a trade-in value of \$5000, and so when you buy the new vehicle, the amount you pay for it is reduced by \$5000. This amount is called the trade-in allowance. A trade in is not considered a retail event that would otherwise be subject to retail taxes. The trade-in allowance is generally based on the known and published **depreciation** of vehicle models. (Look towards the end of these notes for explanation of depreciation)

Manufacturer's Suggested Retail Price

13. The Manufacturer's Suggested Retail Price (**MSRP**) of a car is the selling price that the manufacturer recommends to the retailer, which is the dealership. Each new vehicle comes with an MSRP. The MSRP is also known as the '*sticker price*' because it is placed on a window of the vehicle when it leaves the factory. The MSRP of a vehicle includes the base price, any optional equipment, an air-conditioning excise tax, and a destination or freight charge.

- The base price is the suggested price of the vehicle without any additional features.
- Optional equipment may include any of the options listed on the Vehicle Features Chart. Entertainment Centre, Four Wheel Drive, etc.
- The air-conditioning excise tax is a \$100 payment required for vehicles with air conditioning that are purchased in Canada or imported from the United States. It is an environmental tax. There is an environmental tire tax too!
- The destination charge covers the cost that a dealership must pay to transport the vehicle from the manufacturing facility to the car dealership.

14. The MSRP of a particular vehicle model will be the same at all dealerships. However, the actual sale price may vary by dealership. This is because of arbitrary markups and markdowns imposed by car dealerships. A dealer may increase the price of a car to earn more money, or reduce the price to encourage a sale. Therefore, it is important that you shop around before you decide to purchase a vehicle.

Often dealerships will give base prices for cars with option packages which increase the price. If the car of your choice is not in the parking lot you will also have to pay freight charges and taxes as well.

[See the example MSRP Sticker at the end of these notes]

15. To Calculate the Cost of Buying a New Vehicle (use the following steps):

- Calculate base price + options + freight + additional fees
- Subtract trade allowance
- Add PST (6 to 8%) and GST (5%)
 - *Tax rates tend to change a bit at subject to government policy, so pay attention in workbooks and assignments*

20. **Example 1:** Jesse wants to buy a brand new El Camino at a base price of \$18,200. (lol, this is like 1970's). He adds an Option Group 2 for \$526. Freight (ie: delivery by train from Toronto) on the car is \$640. He can trade in his old Pinto for \$1,000. What is the purchase price of the car?

TOTAL VEHICLE PRICE =

$$18,200 + 526 + 640 = \$19,366$$

MSRP

LESS TRADE IN of \$1,000 =

$$\$19,366 - \$1,000 = \$18,366$$

PLUS TAXES (GST @ 5% & PST @ 7%) =

$$\$18,366 \cdot 0.12 = \$2,203.92 \text{ Taxes}$$

FINAL PURCHASE PRICE =

$$18,366 + 2,203.92 = \$20,569.92$$

NOTE ON CALCULATING PRICE WITH TAXES

21. Recall from previous grades that a final price of an item **with taxes** can be calculated as:

$$\text{Item price with taxes} = \text{Item Price} + \text{Item Price} * \text{GST}\% + \text{Item Price} * \text{PST}\%$$

Which is much more easily calculated as:

$$\text{Item price with taxes} = \text{Item Price} * (1 + [\text{GST}\% + \text{PST}\%])$$

So, a \$600 dollar item with 5% GST and 7% PST would be:

$$\begin{aligned} & \text{Item Price} * (1 + [0.05 + 0.07]) \\ & = \text{Item Price} * (1.12) \\ & = 600 * (1.12) = \mathbf{\$672} \end{aligned}$$

The 1.12 is a *factor* that includes the item price plus the 12% (ie: 0.12) in taxes.

22. **Example 2:** Jackie wants to buy a Toyota Celica which has a base price of \$35,280. She will be charged \$600 for freight and she wants the following options to be added: All Weather Mats (\$103), CD Changer (\$697), and Splash Guards (\$86). If she trades in her old car for \$3,000, what is the purchase price for the car?

$$\begin{aligned} \text{TOTAL PRICE} &= \$36,766 \\ \text{LESS TRADE IN of } \underline{\$3,000} &= \$33,766 \\ \text{PLUS TAXES (5\% GST \& 7\% PST) of } \underline{\$4,411.92} &= \text{taxes} \\ & \quad 33,766 \cdot 0.12 \rightarrow \\ \text{PURCHASE PRICE} &= \$38,177.92 \end{aligned}$$

23. There may be other fees by the dealer for administration paper work and government environmental fees for tires, rust proofing option, etc.

Be careful of 'extra items' and '*upsell*' when closing the deal, many are somewhat unnecessary and they can add up quickly!

24. In addition to the MSRP, the total purchase price of a new vehicle will include a number of fees and taxes. These include a documentation fee, an environmental tire tax, an environmental air conditioning tax, the PST and GST. Many additional costs associated with current taxation policy by government(s).

Outright Purchase (Cash). If you have saved up enough money, you can purchase a new vehicle *outright*. This means that you will not have monthly loan payments. Instead, you will pay for the total purchase price of the vehicle, including any additional features you wish to purchase, before you start driving your vehicle.

Cost of Buying a Vehicle with a Trade-In

25. On a new vehicle, your cost is the price plus PST and GST. If you trade your existing vehicle, you will pay tax only on the difference between the price of the new vehicle and the trade-in. If you purchase a used vehicle from a dealership and you have a trade-in, you also pay the difference between the two vehicles plus the PST and GST on the difference.

Example:

26. Jeff bought a new Chevy truck and used his older Dodge truck as a trade-in. The price of the Chevy was \$32,500, and the trade-in value of the Dodge was \$5,800.

- a. How much will Jeff still have to pay for the truck, after the trade in?
- b. How much does Jeff save if he has a \$5800 trade-in rather than a \$5800 down payment?

27. Solution:

a) Remaining Cost of the vehicle = Price less the trade-in plus taxes on the difference.

$$\text{Cost of the Vehicle} = \$32,500 - \$5,800 = \$26,700$$

$$\text{PST} = \$26,700 \times 0.07 = \$1,869$$

$$\text{GST} = \$26,700 \times 0.05 = \$1,335$$

$$\text{Total Remaining Cost} = \$26,700 + \$1,869 + \$1,335 = \$29,904$$

Remember, a quick way to calculate the taxes would be to multiply by 1.12. Total Cost = \$26,700 x 1.12 = \$29,904

$$\text{b) Total Remaining Cost with down payment} = \$30,600$$

$$\text{Total Remaining Cost with trade-in} = \$29,904$$

$$\text{Savings} = \$30,600 - \$29,904 = \$696$$

*** Note how taxes, particularly PST seems to change in different exercises and notes, that is because it does change by a percent or two every decade. Occasionally we say multiply by 1.13, other times 1.12. With effect July 2020 it will be 1.11 with a 6% PST****

Financing a New Vehicle

31. Because vehicles are expensive, many consumers cannot afford to pay for a vehicle outright. Instead, many consumers **finance** the purchase with a loan from the automobile dealership (*in-house*) or their own financial institution (bank).

32. When you take out a loan from an automobile dealership bank, the total amount you pay is greater than if you were to pay for it outright at the time of purchase. You will need to pay interest for the period off the loan. The difference between the total loan payments and the original total purchase price is known as the finance charge.

33. A car loan is a type of personal loan. In order to calculate monthly payments based on this loan, you need to consult a loan table. The amortization table indicates the monthly payment required to pay off a \$1,000 loan for a given time period and at a given interest rate.

34. If you are tech savvy you likely are aware there are lots of Apps for your phone and lots of bank website that will quickly calculate your loan payments. Check teacher's website or google Loan Payment Calculator!

An Appendix at the end of these notes explains how to use various loan calculators as was done in Grade 11.

35. **Example 1:** Moira Wheeler is able to make a down payment of \$5,000 on the new mid-size automobile she purchases for \$20,340.32 with taxes. In order to finance the remaining amount, she takes out a three-year car loan at a fixed interest rate of 7% APR.

- a) Calculate her monthly payment for the automobile.
- b) Calculate her finance charge for the automobile.
- c) Calculate the full cost of her car

36. **Solution:**

- a) Amount of the loan = Purchase Price – Down Payment
 = \$20,340.32 – \$5,000
 = **\$15,340.32** the amount she finances at the bank

Using the loan amortization table at back of these notes, along with the interest rate of 7% and the loan period of 3 years, we find the rate of \$30.88 per \$1000 of loan.

$$15,340.32 / 1,000 \bullet 30.88 = \$473.71; \text{ her monthly payment}$$

Moira's monthly car payment will be **\$473.71**.

Note: This calculation is just a regular loan payment as in Grade 11 Interest and Credit lessons.

b) Since Moira is repaying the loan in 3 years and there are 12 payments per year, she makes 36 payments overall.

$$36 \bullet 473.71 = \mathbf{\$17,053.53} \text{ total loan payments}$$

Moira pays \$17 053.53 overall for the loan payments for the **\$15,340.32 loan** So she paid **\$17,053.53 – \$15,340.32 = \$1713.21 interest in finance charges**

c) To calculate the full cost of her vehicle we must allow for the fact that made a down payment up front:

$$\begin{aligned} \text{Full Payment} &= \text{Loan Payments} + \text{Down Payment} \\ &= 17,053.53 + 5000 \\ &= \$22,053.53 \end{aligned}$$

The full payment is \$22,053.53.

Or an **alternate way** to calculate her finance charge

$$\begin{aligned} \text{The Finance Charge} &= \text{Full Payment} - \text{Total Purchase Price} \\ &= 22,053.53 - 20,340.32 \\ &= \$1,713.21 \end{aligned}$$

The finance charge is \$1,713.21. This is the amount of interest Moira pays over the 3-year period of the loan.

You Try:

37. **Example 2:** The cost of Toyota Four Runner is \$54 000 plus taxes (freight is included in this price). The Toyota company is offering 7% financing for a three-year loan with a down payment of \$4 050. Determine the monthly payment and the total cost of purchasing the vehicle.

a. Total Cost (Price + taxes) =

$$\$54,000 \cdot (1.12) = \$60,480$$

b. Loan Required (cost – down payment) =

$$\$60,480 - \$4,050 = \$56,430 \text{ to finance}$$

c. Monthly Payment =

$$\$1,742.39/\text{month}$$

d. Total Cost of Purchasing Vehicle

$$\begin{aligned} & \cancel{\$1,742.39/\text{month}} \cdot \cancel{36\text{ months}} + \$4,050 \\ & = \$62,726.20 + \$4,050 = \boxed{\$66,776.04} \end{aligned}$$

Vehicle Payment Calculator

Enter parameters in the green areas

Loan Principal	\$56,430.00
Interest Rate enter as decimal	0.07
Term (months)	36
Monthly Payment	-\$1,742.39
Total Loan Cost	-\$62,726.20
Loan Interest	-\$6,296.20

There may be slight differences in calculations depending on roundings!

Check Yourself:

Do the Check yourself practice worksheet: Vehicle Finance Purchase Questions

LEASING A VEHICLE

40. When you lease a vehicle, you are essentially renting the vehicle from the leaser. You, the lessee, must make monthly payments to pay for the depreciation of the vehicle, the sales taxes on the amount of depreciation and the interest on the unpaid value of the car. At the end of the lease, you will either return the vehicle to the leaser or buy it for the residual value. The residual value is an estimate of the vehicle's worth at the end of the lease as determined by the leaser at the beginning of the lease.

41. When you lease a vehicle, you pay a monthly leasing fee for a specified number of months. At the end of the specified time period, you can either purchase the vehicle or return it to the dealer. If you decide to purchase the vehicle you will purchase it for the residual value. This value is given to you when you lease the vehicle.

42. When you lease a vehicle, you will be required to sign a lease agreement. This agreement specifies:

- the initial value of the item
- the buy out price at the end of the lease (which is the same as the residual value)
- the down payment (if there is one)
- any additional fees
- the interest rate
- the monthly payment and date due.

The lease agreement will also specify other terms or restrictions, such as what is reasonable use and care of the vehicle. A vehicle lease will usually specify how many kilometres you may drive, and the cost per kilometre if you exceed this limit. Exceeding this limit can be rather expensive!

43. Leasing a vehicle is a popular option because there is often little or no down payment and the monthly payments are usually quite a bit lower than when you purchase a vehicle because you are only financing the leased portion of the vehicle's value (not the residual value). With a leased vehicle you will always have a newer vehicle that is under warranty. Also, you will not have to deal with selling or trading the vehicle at the end of the lease. Finally, you can walk away from the vehicle at the end of the lease if you don't want to buy it.

44. The reasons you might prefer to buy rather than lease is that you will never actually own the vehicle and you will always have a monthly payment if you lease. With a lease you are also charged for extra kilometres and any excessive wear and tear on the vehicle. You may also have to pay a penalty if you decide to end the lease early.

The decision whether to purchase a new vehicle outright, purchase through financing, or to lease is complex. You should consider many factors before you make your final decision. If you intend to trade your vehicle in every two to three years, leasing is an attractive option. If you intend to keep your vehicle for longer periods of time, or if you drive more than 20 000 km per year, you may find that leasing is the more expensive option.

Calculating the Cost to Lease a Vehicle

45. The calculation of taxes on leases can be very complicated depending on the situation. For the purposes of this course you will be instructed in the question how to calculate the taxes on the payments as well as the residual value.

Example 1:

46. A minivan sells for \$28 500 and leases for \$479 per month plus taxes for a lease term of 24 months. A down payment of \$3275 is required. The residual value of the vehicle is 65% of the sales price plus taxes.

- a. Calculate the total monthly leasing payment.
- b. Calculate the total amount paid by the end of the lease.
- c. Calculate the total residual value of the minivan, including taxes.
- d. Calculate the total cost of the vehicle if it is purchased outright at the end of the lease.

Sample Solutions:

- a. Total monthly leasing payment is the lease payment plus PST and GST.

$$\text{Total monthly leasing payment} = \$479 \times 1.12 = \$536.48$$

- b. Total amount paid by the end of the lease

$$\begin{aligned} &= \text{down payment} + \text{lease payments} \\ &= \$3275 + \$536.48 \times 24 \\ &= \$3275 + \$12\,875.52 \\ &= \$16\,150.52 \end{aligned}$$

- c. Residual value of the minivan, including taxes

$$\begin{aligned} &= 65\% \text{ of } \$28\,500 \\ &= 0.65 \times \$28\,500 \\ &= \$18\,525 \\ \text{Including taxes} &= \$18\,525 \times 1.12 = \$20\,748.00 \end{aligned}$$

- d. Total cost of the vehicle if it is purchased at the end of the lease

$$\begin{aligned} &= \text{down payment} + \text{lease payments} + \text{residual value} \\ &= \$3275 + \$536.48 \times 24 + \$20\,748.00 \\ &= \$3275 + \$12\,875.52 + \$20\,748.00 \\ &= \$36\,898.52 \end{aligned}$$

Example 2:

47. Use the same information from the previous example. In this scenario, the minivan is not purchased outright but is financed at the end of lease with a 3 year vehicle loan at an interest rate of 6%. Use an Online Loan Calculator or the Vehicle Payment Calculator spreadsheet. Calculate the monthly payment on the residual value of the minivan.

- a. Calculate the total amount paid on the residual value.
- b. Calculate the total amount paid for the minivan through the lease and financing of the residual value.

Monthly payment is \$631.19.

Total amount paid on the residual value is \$22,723.00, found using the spreadsheet, the loan calculator or $\$631.19 \times 36 = \$22,722.84$. Again, the answer differs slightly due to rounding.

	A	B
1	Vehicle Payment Calculator	
2		
3	Loan Principal	\$ 20,748.00
4	Interest Rate(%)	6.00%
5	Term (months)	36
6		
7	Monthly Payment	\$631.19
8	Total Loan Cost	\$22,723.00
9	Loan Interest	\$1,975.00

48. Total cost to purchase the minivan through original lease and the 'buy out' financing

= down payment + lease payments + financing payments

= \$3,275 + \$536.48 x 24 + \$631.19 x 36

= \$3,275 + 12,875.52 + \$22,722.84 = \$38,873.36

Check Yourself:

Do the Check yourself practice worksheet: Vehicle Finance Lease Questions

COST OF OPERATING A VEHICLE

50. **Fuel Costs and Fuel Economy.** A major operating cost of a vehicle is the gasoline. Different vehicles require different amounts of gasoline to drive the same distance. The number of litres of gasoline a vehicle requires to travel 100 km is known as its fuel consumption rate or fuel economy.

The fuel consumption rate of your vehicle affects your gasoline expenses. A higher fuel consumption rate corresponds to a higher cost of driving your vehicle a certain distance (and a lower rate costs lower costs).

51. For example, a fuel consumption rate of 7.4L/100 km means that 7.4 litres of gasoline are required to travel 100 km. The fuel consumption rate of your vehicle will vary depending on:

- When you drive
- How you drive
- The type of vehicle you drive
- The types of optional equipment installed
- The condition of your vehicle

52. Most manufacturers voluntarily place a fuel consumption rate label on new vehicles. The labels state the city and highway fuel consumption rates for that particular model. The fuel consumption rate is higher for city driving than highway driving because of stop-and-go driving. Extra fuel is used while a vehicle is idling during a red light, and while accelerating. (*Note: when bought new, it could take up to 10 000 km for the vehicle to reach the stated fuel consumption rate)

53. The following is the formula for determining the fuel economy of a vehicle:

$$\text{Fuel consumption rate} = \frac{\text{Litres used}}{\text{kilometres driven}} * 100$$

Fuel consumption rate is expressed in **units** of **L/100 km**.

54. **Example 1:** At 60 km per hour, a sedan uses 18.4 L of gasoline to drive 225 km. At 100 km per hour, the sedan uses 22.1 L of gasoline to drive the same distance.

- a) Find the fuel consumption rate for the sedan at 60 km/hr.
- b) Find the fuel consumption rate for the sedan at 100 km/hr.
- c) Find the percent increase in fuel economy.

55. **Solution:**

a. At 60km/hr. Fuel consumption rate = $\frac{18.4}{225} * 100 = 8.2$

So, the sedan uses 8.2L/100km at a speed of 60 km/hr

b. At 100km/hr. Fuel consumption rate = $\frac{22.1}{225} * 100 = 9.8$

So, the sedan uses 9.8L/100km at a highway speed of 100 km/hr

c. The increase in fuel consumption is $9.8/100\text{km} - 8.2/100\text{km} = 1.6\text{L}/100\text{km}$

d. So, the percentage increase in fuel consumption is $1.6/8.2 * 100$ or a 19.5% penalty for driving at a higher speed.

56. **Example 2:** The Fender family is planning a vacation where they will drive a distance of about 5000 km. The family has two vehicles: a sedan and a van. The fuel consumption rate is 8.8 L/100km for the sedan and 12.7 L/100km for the van.

- Calculate the amount of gasoline required by the sedan to complete the trip.
- Calculate the amount of gasoline required by the van to complete the trip.
- Which vehicle would be more fuel efficient and, therefore, less costly to drive?
- What other factors might the Fender family consider as they decide which vehicle to take on their vacation?

57. **Solution.**

a. calculate the number of litres used by the sedan. $\frac{8.8\text{L}}{100\text{km}} = \frac{x}{5000}$

So, the sedan will consume 440 L of gas.

b. calculate the number of litres used by the van. $\frac{12.7\text{L}}{100\text{km}} = \frac{x}{5000}$

So, the van will consume 635 L of gas.

c. The sedan is more efficient, more economical, and will require 195 L less gas for the trip.

d. Of course, the reliability of the vehicle, the comfort, etc may factor into the decision.

58. **Example 3:** How much does it cost to fill a 40L tank at \$1.21/L?

$$40\cancel{\text{L}} \cdot \cancel{\$1.21/\cancel{\text{L}}} = \boxed{\$48.40}$$

59. **Example 4:** What is the cost per litre if a 50 L tank costs \$58 to fill?

$$\cancel{\$58/50\cancel{\text{L}}} = \cancel{\$x/\cancel{\text{L}}} ; x = \$1.16 ; \boxed{\$1.16/\text{L}}$$

60. **Example 5:** How many litres does it take to fill a tank that costs \$60 to fill at a price of \$1.10 / L? WITH?

$$\cancel{\$1.10/\cancel{\text{L}}} = \cancel{\$60/\cancel{x\text{L}}} ; x = \frac{60}{1.10} = \boxed{54.55\text{L}}$$

61. **Example 6:** The odometer of a mid-size car reads 34,719 km at the beginning of a trip and 34,853 km at the end. The car consumes 12.4 L of gasoline during the trip. Recall that the odometer of a car tells you the total distance (in km) the vehicle has been driven during its entire life.

a) Determine the fuel economy of the sedan.

b) If the cost of gasoline is 112.9¢ per litre, find the cost of driving 100 km.

62. **Solution:**

a) The number of km driven during the trip = $34\,853 - 34\,719 = 134$ km
 Fuel consumption rate = $12.4 / 134 \times 100 = 9.3$ L/100km.

b) The cost of gasoline = $9.3 \times 112.9 \text{ ¢} = 9.3 \times \$1.129 = \$10.50$ for every 100km

*Curious! In the 'old' days when we used miles to measure distances we referred to the **mileage** a car had consumed in gas. Despite that Canadians converted to kilometres 45 years ago there is no equivalent word to explain the kilometres driven. So, it is not unusual at all to hear people talk about 'mileage' even though they mean what should semantically be called 'kilometrage' for the fuel consumption rate of their vehicle.*

Vehicle Maintenance and Repairs

63. The key to a long lasting vehicle is regular maintenance. It is a good idea to create a vehicle maintenance schedule and stick to it. Here are vehicle maintenance tips that may help:

- Monthly checks for tire inflation and condition, operation of lights, and fluid levels.
- Check the transmission fluid, battery and cables, belts, engine air filter, oil and filter, exhaust, fuel filter, power steering fluid and hoses every 3-6 months.
- Ensure that you follow the suggested kilometre schedule for oil changes.
- Do 6 month checks on chassis lubrication, polish and wiper blades.
- Do 12 month checks on brakes, cabin air filter, coolant, spark plugs and steering and suspension.

64. Regardless of how well you maintain your vehicle, as it ages, it is more likely to need repairs. New vehicle warranties generally expire from 3 to 4 years after date of purchase, or when a certain number of kilometres have been driven (whichever comes first). When a vehicle is off warranty, the owner is responsible for paying for the repairs.

Example:

65. Sam takes his car in for regular service and the technician discovers the radiator hose needs to be replaced. The servicing of the vehicle requires three litres of oil at \$5.66 per litre, an oil filter for \$11.99, and half litre of washer fluid worth \$2.25 a litre. The radiator hoses costs \$12.95 and the antifreeze then needs to be topped up at a cost of \$1.99 per litre. The vehicle will require 4 litres of antifreeze. the total time required to service vehicle is 1 hour 15 minutes. The rate the service station charges for labour is \$80 per hour. PST and GST are charged on parts and labour. Find the total cost of servicing and repairing the vehicle.

Sample Solution:

$$\begin{aligned} \text{Cost of Parts} &= \$5.66 \times 3 + \$11.99 + \$2.25/2 + \$12.95 + \$1.99 \times 4 \\ &= \$16.98 + \$11.99 + \$1.13 + \$12.95 + \$7.96 \\ &= \$51.01 \end{aligned}$$

$$\begin{aligned} \text{Cost of labour} &= 1.25 \text{ hours} \times \$80/\text{hr} \\ &= \$100.00 \end{aligned}$$

$$\begin{aligned} \text{Cost of labour and parts} &= \$151.01 \\ \text{PST} &= \$151.01 \times 0.07 = \$10.57 \\ \text{GST} &= \$151.01 \times 0.05 = \$7.55 \end{aligned}$$

$$\begin{aligned} \text{Total cost of service} &= \$151.01 + \$10.57 + \$7.55 \\ &= \$169.13 \end{aligned}$$

VEHICLE DEPRECIATION

70. Vehicles are famous for their rapid *depreciation*. You have maybe heard it said that a new vehicle loses a fifth (20%) of its value the moment you drive it off the lot!

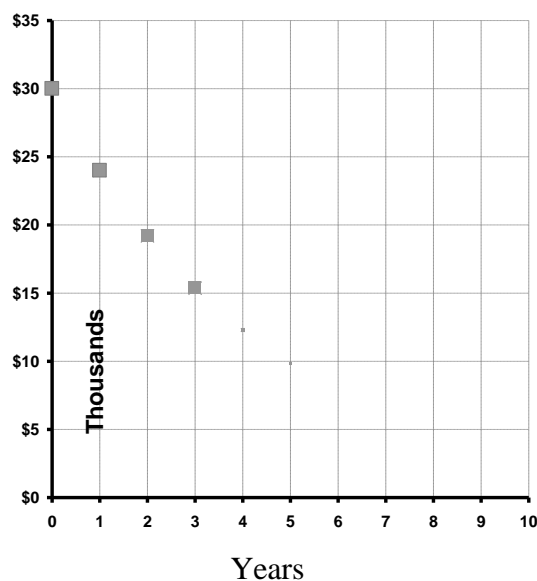
71. Vehicles are not purchased to make money and to grow in value like a savings account or some other investment device, they are purchased to get about from A to B whether for work or for pleasure. Of course, some folks buy vehicles for other purposes: status; hobby; recreation.

72. Depreciation is how much a vehicle's value '*decays*' every year. *Notionally* a vehicle will depreciate at an average of 20% per year. The rate at which a vehicle depreciates in value is dependent on the make and model. Every year it is worth 20% less than the previous year. Complete the table and prepare the graph below.

Complete the table:

Start Year	Value	Depreciate	End Year
1	30,000	6,000	24,000
2	24,000	4,800	19,200
3	19,200		
4			
5			
6			
7			
8			
9			
10			

Graph.



73. Notice that the depreciation curve is not ‘*linear*’ (as studied in Grade 11). Every increase in the x (years) is not the same increase or decrease in the y , **\$value**. The vehicle does not depreciate by the **same amount** of value **every year**, it depreciates instead by just the **same percentage** of value **every year**. Or as we learned to say in Grade 11:

$\frac{\Delta y}{\Delta x}$ is not constant. ie: the points on the graph do not fall on one big similar triangle. Consequently, doubling the time doesn’t halve the value of the vehicle. The value drops off quickly at first (steep ‘slope’). The value of the car levels off and approaches zero \$ after many years.

74. This type of ‘*curve*’ is called ‘*exponential decay*’ if you were to study it in Applied Math or Pre-Calculus Math. Notice that the value of the car never actually does get down to zero.

Notice however that over a short period of 4 to 5 years the depreciation is almost ‘*linear*’; consequently, the basic linear mathematics with which you are likely more familiar will provide a sufficiently close depreciation model.

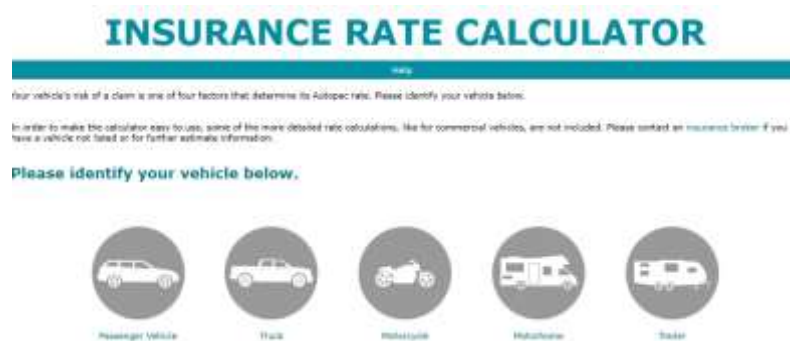
Calculating Vehicle Insurance Rates

You will need access to the internet for this.

75. It is mandatory by law to insure your vehicle. You need insurance in case you damage your vehicle or you damage another vehicle (or person).

There is lots of lexicon associated with insurance. See the glossary of terms at the end of these notes.

76. Use the MPI "Insurance Rate Calculator" (google: MPI Insurance Rate Calculator) to obtain an estimate for the following vehicle.



- 2009, Chevrolet Cobalt LS, 2-door
- Manitoba resident with postal code R4H 1H7, insuring in the Municipality of Winnipeg.
- All-purpose insurance with a 10% discount, 500 deductible, \$1,000,000 third party liability.

The car will not be insured for Auto Loss of Use or New car protection and the vehicle is not valued at over \$50 000 so no selection is required for these. The payment type chosen is full payment.

Result:**INSURANCE RATE CALCULATOR**

Start New Estimate Change Vehicle Use Change Vehicle Information Change Insurance Change Residency Help			
Estimate for:	2020 Rates		2019 Rates
2009 CHEVROLET COBALT LS	Effective Mar 01, 2020	Effective Mar 01, 2020	Effective Mar 01, 2019
Basic Insurance Premium	\$1,507		\$1,635
Deductible	\$0		\$0
Third Party Liability	\$11		\$12
Interest and Administration Fee	\$0		\$0
Total Insurance Cost	\$1,518		\$1,647
Registration Charge	\$154		\$154
Plate Use Charge	\$7		\$7
Total Registration Cost	\$161		\$161
TOTAL ESTIMATE	\$1,679		\$1,808

[Print Estimate](#)
Page 5 of 5

77. Your Manitoba Public Car insurance will cost \$1,679 per year (in the year 2020). Of course, every year it tends to go up (or down) by a few dollars.

DRIVER LICENCE

78. A completely separate cost not related to the car itself is your Driver Licence and your driver rating . Depending on your Driver rating your driver licence can cost anywhere between \$35/yr (mine) to \$3,000/yr (if you have lots of driving offences).

We will not discuss driver licence cost further in this unit, suffice it to say it is an important consideration for any driver.

Check Yourself:

Do the Check yourself practice worksheet:
Vehicle Finance Maintenance and Insurance Questions

LEASE VS BUY

80. **Lease.** To lease a vehicle is to use a car for a few years and then return it to the dealer. You only pay for the amount of the car that you ‘use up’, ‘the depreciation’.

81. When you lease a vehicle, you are essentially renting the vehicle from the *lesser*. You, the *lessee*, must make monthly payments to pay for the depreciation of the vehicle, the sales taxes on the amount of depreciation and the interest on the unpaid value of the car. At the end of the lease, you will either return the vehicle to the lesser or buy it for the **residual value**. The residual value is an estimate of the vehicle's worth at the end of the lease as determined by the lesser at the beginning of the lease.

82. Of course, you might incur extra costs on your lease if you return the car damaged or with an excessive number of kilometres used on it. And like owning the car you still have to pay for regular maintenance, and fuel, and insurance etc.

83. Typically, leases are for two or three years. Of course, the conditions of a lease can vary widely. Generally, the main reason to lease is to have a nice shiny clean car every few years if you are carrying clients and customers. Most people prefer to buy a vehicle and drive it for 10 or 15 years until it gets too expensive to fix.

List some advantages and some disadvantages of leasing a vehicle as opposed to out-right buying a vehicle. An internet search is most appropriate! The Unit Workbook lists a few as well.



84. Some simple examples follow. Keep in mind that these are very simple examples. The actual terms of the contract and especially the calculation of taxes are certainly not as simple in reality. Check YouTube or teacher's Unit playlist for Leasing A Vehicle; there are some notable considerations.

85. **Lease Example 1:** A minivan sells for \$28,500 and leases for \$479 per month plus taxes for a lease term of 24 months. A down payment of \$3,275 is required. (The primary purpose of a **down payment** for any sizeable purchase is to ensure your genuine interest and your capacity to actually pay). The residual value of the vehicle is 65% of the sales price plus taxes.

- Calculate the total monthly leasing payment.
- Calculate the total amount paid by the end of the lease.
- Calculate the total residual value of the minivan, including taxes.
- Calculate the total cost of the vehicle if it is purchased outright at the end of the lease.

86. **Sample Solutions:**

Total monthly leasing payment is the lease payment plus Provincial Sales Tax (PST) and federal Goods and Services Tax (GST)

Assume PST is 8% and GST 5%.

Price + 8% of price + 5% of price is

Price + 13% of Price;

so, by factoring the common price we get :

Price*(1+.13) = Price * (1.13)

*Careful,
PST bounces
between 7%
and 8%
throughout
these notes*

Total monthly leasing payment = \$479 x 1.13 = \$541.27

Total amount paid by the end of the lease

= down payment + lease payments

= \$3,275 + \$541.27 • 24

= \$3,275 + \$12,990.48

= \$16,265.48

Residual value of the minivan, including taxes

= 65% of \$28 500

= 0.65 x \$28 500

= **\$18,525**

Including taxes = \$18 525 x 1.13 = **\$20,933.25**

Total cost of the vehicle if it is purchased **outright** at the end of the lease
 = down payment + lease payments + residual value
 = \$3,275 + \$541.27 x 24 + \$20,933.25
 = \$3,275 + \$12,990.48 + \$20,933.25
 = **\$37,258.73**

87. **Example 2:** Use the same information from the previous example. In this scenario, the minivan is not purchased outright but is financed at the end of lease with a 3 year vehicle loan at an interest rate of 6%. Use the tables provided at the end of these notes to calculate the financing or an App or on-line loan calculator. Note there are lots of on-line calculators that will provide the same calculation and also note that such calculations are relatively easy in any spreadsheet program.

a) Calculate the monthly payment on the residual value of the minivan.

\$636.83/month from App

b) Calculate the total amount paid on the financed residual value.

\$636.83/month · 36 months = \$22,925.88

c) Calculate the total amount paid for the minivan through the lease and financing of the residual value.

22,925.88 + 16,265.48 = \$39,191.36
 buy out lease payments + down payment With financed buy out

90. **Example 3.** A car is **valued** at \$28 995. It can be leased for \$480.81 per month which includes PST and GST for 36 months with a down payment of \$1500. At the end of the three-year period, the residual buy-out amount is 55% of the original price plus taxes. Assume the car will be bought at lease end without financing. The car can also be purchased for its MSRP Value of \$28 995 plus the PST (7%) and GST. The purchase is financed (with a down payment of \$1500) at 6% for three years, compare the costs of buying and leasing the vehicle.

**Note: assume that in both situations you want to own the vehicle at the end of three years.

Sample Solution:

91. Purchase Option:

The cost to finance the car at 6% for 3 years is \$33 922.85.

Use a loan calculator

A	B	C
Vehicle Payment Calculator		
<i>Enter parameters in the green areas</i>		
Loan Principal	\$30,974.40	
Interest Rate <i>enter as decimal</i>	0.06	Example: 5% = 0.05
Term (months)	36	
Monthly Payment	-\$942.30	Negative Values
Total Loan Cost	-\$33,922.85	Come out of your pocket
Loan Interest	-\$2,948.45	

Use a loan calculator

Total cost to purchase = \$33 922.85 + \$1500.00 (down payment)
= **\$35 422.85**

92. Leasing Option:

Total Payments = \$480.81 x 36 payments = \$17 309.16

Residual value = \$28 995 x 0.55 = \$15 947.25

Residual value plus taxes = \$15 947.25 x 1.12 = \$17 860.92

Total cost to Lease = \$17 309.16 + \$17 860.92 + \$1500.00 = \$36 670.08

Compare the cost of buying to leasing this vehicle:

Cost to Lease = \$36 670.08

Cost to buy = \$35 422.85

Difference = \$1247.23

From a strictly financial stand point, it is better to buy the vehicle than to lease the vehicle because in both cases you own the vehicle at the end of three years (if you buy the leased vehicle at end of lease). But of course, there are other factors to consider such as the affordability of the monthly payment if you buy versus lease. If you buy the monthly payment is \$942.30 and if you lease the monthly payment is \$480.81. Although the lease payment is much lower per month, you still owe \$17 860.92 at the end of the lease.

Check Yourself:

Do the Check yourself practice worksheet:
Vehicle Finance Lease Vs Buy Questions

Congratulations

You are done the unit of Car Finance

Check Yourself:

**Do the Check yourself practice worksheet:
Vehicle Finance Review Questions**

**And there are plenty more practice questions on the teacher's webpage.
Check out the Unit B Vehicle Purchase Workbook too!**

APPENDIX 1 – VARIOUS LOAN CALCULATORS

LOAN TABLES. Monthly repayment rate **per thousand** \$ borrowed.

Annual Rate	1 Year Monthly	2 Years Monthly	3 Years Monthly	4 Years Monthly	5 Years Monthly	10 Years Monthly
2%	\$84.24	\$42.54	\$28.64	\$21.70	\$17.53	\$9.20
3%	\$84.69	\$42.98	\$29.08	\$22.13	\$17.97	\$9.66
4%	\$85.15	\$43.42	\$29.52	\$22.58	\$18.42	\$10.12
5%	\$85.61	\$43.87	\$29.97	\$23.03	\$18.87	\$10.61
6%	\$86.07	\$44.32	\$30.42	\$23.49	\$19.33	\$11.10
7%	\$86.53	\$44.77	\$30.88	\$23.95	\$19.80	\$11.61
8%	\$86.99	\$45.23	\$31.34	\$24.41	\$20.28	\$12.13
8.5%	Interpolate			\$24.65		
9%	\$87.45	\$45.68	\$31.80	\$24.89	\$20.76	\$12.67
10%	\$87.92	\$46.14	\$32.27	\$25.36	\$21.25	\$13.22
12%	\$88.85	\$47.07	\$33.21	\$26.33	\$22.24	\$14.35
15%	\$90.26	\$48.49	\$34.67	\$27.83	\$23.79	\$16.13
20%	\$92.63	\$50.90	\$37.16	\$30.43	\$26.49	\$19.33
25%	\$95.04	\$53.37	\$39.76	\$33.16	\$29.35	\$22.75
30%	\$97.49	\$55.91	\$42.45	\$36.01	\$32.35	\$26.36

You **do not** want to be paying 20% to 30%. That is called a **predatory rate**. Someone is *preying* on you at that rate.

Example. You borrow \$30,000 for 4 years at 8% Annual Percentage Rate (APR). Your monthly payments are \$24.41 for each thousand you borrow. So, your monthly payment on \$30,000 is 30 times as much or \$732.30 per month. So, your loan is paid off after 48 monthly payments (ie: 4 years) of \$732.30 so a total of \$35,150.40 in monthly loan payments. So, your \$30K loan cost you about \$5,150.40 in interest finance charges.

Interpolate Table Values. To calculate 8.5% just go halfway between the 8% and the 9% values. Example; monthly payments 1t 8.5% for three years:

$$\frac{31.80+31.34}{2} = 31.57 \text{ per thousand per month payment}$$

To interpolate for 5.8%; simply add 0.8 times the difference between 6% and 5% to the 5%. So, 5.8% for 3 years would be $0.8 * (30.42 - 29.97) + 29.97 =$ **30.33**

USING A BANK WEBSITE

Every bank has a loan calculator on its website. Find one, book mark it in your favourites.

Here are two examples of bank loan calculators

Example: You borrow **\$30,000** for **4 years** at **8%** Annual Percentage Rate (APR).

ASSINIBOINE CREDIT UNION LOAN CALCULATOR

The screenshot shows a loan calculator interface with the following inputs and outputs:

Input	Value	Output	Value
Loan Amount	\$30,000	Loan Payment:	\$732.39
Payment Frequency	Monthly	Total interest over term:	\$5,154.57
Loan Term	4 years	Total payment amount:	\$35,154.57
Interest Rate	8.000 %		

BMO Loan Calculator

The screenshot shows the BMO loan calculator interface with the following inputs and outputs:

Input	Value	Output	Value
Loan amount	\$30,000	Your estimated monthly loan payment	\$732
Payment frequency	Monthly	Buttons	BOOK AN APPOINTMENT, APPLY ONLINE
Interest rate	8.00%		
Amortization	4 years		

Notice the on-line calculators **differ** by about 30 cents from the table method. The table values of course were just rounded, so they would be slightly less accurate by less that a tenth of one percent error (a few cents per month perhaps).

USING A SPREADSHEET FOR LOAN PAYMENTS

If you are familiar with EXCEL or Google Sheets you may have discovered the PMT financial function in your previous studies. Your teacher will provide you with access to a simple Spreadsheet that works on any device.

A	B	C
Vehicle Payment Calculator		
<i>Enter parameters in the green areas</i>		
Loan Principal	\$30,000.00	
Interest Rate <i>enter as decimal</i>	0.08	Example: 5% = 0.05
Term (months)	48	
Monthly Payment	-\$732.39	Negative Values Come out of your pocket
Total Loan Cost	-\$35,154.61	
Loan Interest	-\$5,154.61	

A spreadsheet has values and formulae that operate on those values.

All you need to do is enter your loan details in the green areas, the Spreadsheet calculates the rest.

Make sure you put the percent symbol (%) on the interest amount.

Notice the negative values, that is money that comes out of your pocket.

GLOSSARY**amortization**

the repayment of the principal and the interest on a loan by equal payments over a fixed period of time. In the case of a car or truck this is often 3 years to 7 years.

balance

the result when money is added to or subtracted from an original amount. Your monthly balance owing on a loan is your entire loan amount less what principal and interest you have paid off already.

bi-weekly

Occurs every two weeks. Many people are paid every second Friday for example. There are 26 bi-weekly periods in a year. Often, we want to convert a bi-weekly amount into a monthly amount:

$$\begin{aligned} & \$1000 / \text{bi-weekly period} * \frac{26 \text{ bi-weekly pds}}{1 \text{ yr}} * \frac{1 \text{ yr}}{12 \text{ months}} \\ & = \$2,166.67 / \text{month} \end{aligned}$$

In effect you take the bi-weekly amount, convert it to an annual amount, then convert it back to a monthly amount.

So, multiply the bi-weekly amount by 26 then divide by 12 to get the monthly amount!

(Make sure that is on your study notes [Cheat sheet])

Book Value

The book value of a vehicle is the nominal value of a vehicle model for normal wear and tear for a particular model year. There are multiple related books: The one used in Manitoba is the **Sanford Evans Gold Book**. Another frequently used one is the **Blue Book**.

deductible	In insurance, deductible is the amount you pay up front, the insurance company(ies) cover the remainder. If you have a \$500 deductible, the first \$500 of the repair cost is paid by you! If you want to lower that to \$200, of course it will cost you extra in you premium.
credit	an arrangement where goods or services are provided on the understanding that they will be paid for at a later date
depreciation	The loss of value of an item. Generally, as items get older the value drops off quickly at first and levels off after many years. It is an ' <i>exponential decay</i> ' in value, ie: every year there is a <i>percentage</i> decrease in value.
down payment	An amount of money that you pay up front 'on the barrel head'. A show of good faith, it partly assures the Loaner that you have some financial means. Paying a larger down payment also means you do not need to take as large a loan, thus saving interest.
loss of use coverage	Insurance allows you to select additional loss of use coverage , so that in the event your car is disabled for an extended period the insurance will cover a replacement rental.
period of a loan	the time it takes to pay back the loan. See: amortization period.
principal	the amount of a loan or an investment.
rate	a certain quantity or amount of one thing considered in relation to a unit of another thing. Interest is a rate, Eg: % / yr.

Residual value

Similar idea to depreciation. The agreed value of a vehicle at the end of its lease period provided it has been properly cared for. You have the option at the end of a lease to purchase ('buy out') the vehicle if you like it.

Third party liability

In the context of insurance, YOU are the first party, the insurance company is the second party. If something happens to you or your car the two parties resolve the issue.

Third party is if you damage or injure someone else or their property. Accidentally hitting a little old lady at a cross walk or ramming into a restaurant window could cost you hundreds of thousands of dollars, so you need Third Party liability coverage.

Example MSRP Sticker Price



Vehicle Description:
F-150
2018 F-150 4 X 4 Supercab
2.7 Litre V6 engine

STANDARD EQUIPMENT INCLUDED AT NO EXTRA CHARGE

EXTERIOR

- BOXLINK
- DAYTIME RUNNING LIGHTS
- FOG LAMPS
- FULLY BOXED STEEL FRAME
- HEADLAMPS - AUTOLAMP (ON/OFF)
- LED BOX LIGHTING
- PICKUP BOX TIE DOWN HOOKS
- POWER ADJ/HEATED/POWER FOLD EXTERIOR MIRRORS
- POWER SLIDING REAR WINDOW W/DEFROST & PRIVACY TINT
- POWER TAILGATE LOCK
- REAR, 170-DEGREE DOOR
- TRAILER SWAY CONTROL

INTERIOR

- 8.0" CTR STACK TOUCH SCR N
- 8.0" PRODUCTIVITY SCREEN
- 10-WAY PWR DRW/PASS SEATS
- 60/40 FOLD-UP REAR BENCH SEAT
- A/C W/DUAL CLIMATE CONTROL
- ADJUST PEDALS W/MEMORY
- AMBIENT LIGHTING
- AUTO DIM REARVIEW MIRROR
- HTD/COOLED DVR/PASS SEATS
- LEATHER TRIMMED SEATS
- LEATHER WRAPPED STR WHEEL
- MEMORY DRIVER SEAT
- TILT/TELESCOPE STR COLUMN

FUNCTIONAL

- AUTO START STOP TECH
- CLASS IV TRAILER HITCH W/ SMART TRLR TOW CONNECTOR
- DYNAMIC HITCH ASSIST
- ELECTRIC-ASSIST PARK BRAKE
- FAIL-SAFE COOLING SYSTEM
- GAS-CHARGED SHOCKS
- HILL START ASSIST
- INTELLIGENT ACCESS W/PUSH BUTTON START
- OUTBOARD MNTD REAR SHOCKS
- REAR VIEW CAMERA
- SELECTSHIFT TRANSMISSION
- SIRIUS SAT SVC N/A AK&HI
- SYNC@3

SAFETY/SECURITY

- ADVANCED SECURITY PACK
- ADVANCETRAC WITH RSC
- AIRBAGS - FRONT SEAT MOUNTED SIDE IMPACT
- AIRBAGS - SAFETY CANOPY
- CTR HIGH MOUNT STOP LAMP
- SOS POST CRASH ALERT SYS
- TIRE PRESSURE MONITOR SYS

WARRANTY

- 3YR/36,000 BUMPER / BUMPER
- 5YR/60,000 POWERTRAIN
- 5YR/60,000 ROADSIDE ASSIST

INCLUDED ON THIS VEHICLE	(MSRP)		(MSRP)
EQUIPMENT GROUP 501A	1,585.00	PRICE INFORMATION	
• LARIAT SERIES		BASE PRICE	\$44,610.00
• BLIS W/TRAILER TOW MONITORING		TOTAL OPTIONS/OTHER	7,235.00
• REMOTE START SYSTEM		TOTAL VEHICLE & OPTIONS/OTHER	51,845.00
• REVERSE SENSING SYSTEM		DESTINATION & DELIVERY	1,295.00
• LED SIDE-MIRROR SPOTLIGHTS		TOTAL BEFORE DISCOUNTS	53,140.00
• 110V/400W OUTLET		LAR MID CHROME OR SPRT	- 750.00
OPTIONAL EQUIPMENT/OTHER		TOTAL SAVINGS	- 750.00
275/55R20 BSW ALL-TERRAIN	NO CHARGE		
3.55 ELECTRONIC LOCK RR AXLE	NO CHARGE		
65004 GVWR PACKAGE			
FRONT LICENSE PLATE BRACKET	NO CHARGE		
CALIFORNIA EMISSIONS SYSTEM	NO CHARGE		
POWER MOONROOF	995.00		
VOICE-ACTIVATED NAVIGATION	795.00		
FX4 OFF-ROAD PACKAGE	770.00		
SKID PLATES			
20" SIX-SPOKE PAINTED ALUM WHL	1,095.00		
LARIAT SPORT APPEARANCE PKG	1,995.00		
LEATHER BUCKET SEATS W/CONSOLE	NO CHARGE		

	RAMP ONE		TOTAL MSRP \$52,390.00
	CA04		
	RAMP TWO	FINAL ASSEMBLY PLANT	This label is affixed pursuant to the Federal Automobile Information Disclosure Act. Gasoline, License, and Title Fees, State and Local taxes are not included. Dealer installed options or accessories are not included unless listed above.
		DEARBORN	

Former teaching points use to include the idea of TDSR to calculate what you can afford.

Current versions of curriculum do not include it.

What Can You Afford?

14. Once you have decided to buy a vehicle, you need to determine how much you can afford to pay for it. To do this, you use the **Total Debt Service Ratio (TDSR)**. The following formula will help you calculate the TDSR:

$$\text{TDSR} = \frac{\text{Monthly Housing Costs} + \text{All other monthly debts}}{\text{Gross Monthly Income}} \times 100\%$$

The TDSR should never exceed 40%. You still need money for food and clothes and entertainment etc.

Make sure you transcribe this formula into your Study Notes (cheat sheet).

TDSR EXAMPLE CALCULATION

15. **Example 1.** Chaska and Jacy are a newly married couple who have just moved into their own house. They are trying to decide if they can afford a new car. The car they wish to purchase will cost them \$149 bi-weekly. They are currently living in a bungalow with a monthly mortgage of \$1,200. Heating costs are \$75 a month, and property taxes are \$1,300 a year. Chaska also has a credit card debt that she is paying off with monthly payments of \$120. Chaska and Jacy's combined gross monthly income is \$4,600.

- a) Calculate their TDSR.
- b) Should Chaska and Jacy purchase this car?

16. **Solution.** First, we must convert the *bi-weekly* car cost into a monthly cost. Since a bi-weekly payment is a payment that occurs every two weeks. As there are 52 weeks in a year, there are 26 bi-weekly payments in a year. Therefore, you need to multiply the bi-weekly payment by 26 (which equals the annual amount), then you divide by 12 (in order to find the monthly amount).
 Bi-weekly Amount x 26 = Annual Amount / 12 = Monthly Car Costs
 $149 \times 26 = 3874 / 12 = \322.83

$$\text{TDSR} = \frac{1,200+75+108.33+120+322.83}{4,600} * 100\% = 39.3\%$$

Notice how we had to convert the annual \$1,300 property tax into a monthly amount too!

$$\$1,300/\text{yr} \cdot \frac{1 \text{ yr}}{12 \text{ months}} = \$108.33/\text{month}$$

Since their TDSR is very close to 40%, purchasing the car may not leave Chaska and Jacy enough money for unexpected expenses. They may want to consider a car that has lower payments, unless, however, they have plans to finish paying off their other debt (i.e. credit card debt) in the very near future.

You try:

17. Cade wants to determine how much money he can spend on a vehicle. He is currently living in an apartment with rental fees of \$850 a month. Cade's rent does not include heating, which is an additional \$60 a month. Cade has no credit card debt (or child support, etc) and his monthly income is \$2,500.

- Based on the Total Debt Service Ratio, what is the maximum amount of money Cade can spend on a vehicle?
- Cade sees an advertisement in the paper for a new Dodge Neon for \$130 a month. Can Cade afford this vehicle?

SHOW WORK:

$$\text{Hint: } 40\% = \frac{\$850+\$60+x}{\$2,500} * 100\%$$

- a) max = \$90/month b) No, he cannot afford it

