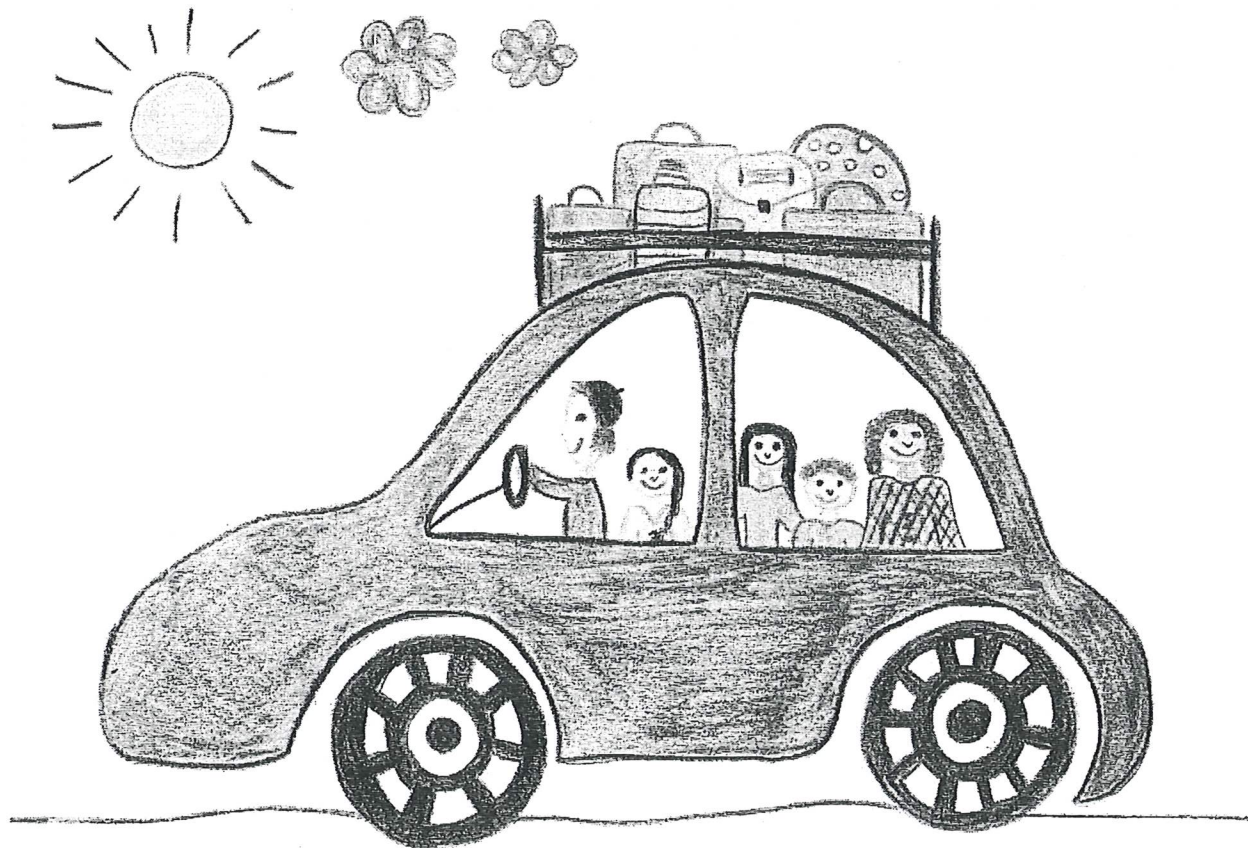


Grade 12 Essential Math

Key

Vehicle Finance

Notes and Examples



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Vehicle Finance Formulas and Taxes

Fuel Economy in L/100 km (FE)	$FE = \frac{\text{Fuel used in litres}}{\text{Distance in km}} \times 100$	
Taxes on Vehicle Purchases		
	PST	GST
Buying New	PST	GST
Buying Used from a Dealership	PST	GST
Buying Used Privately	PST calculated on greater of book value or purchase price	No GST
Safety	No PST	GST
Materials and Labour	PST	GST
Lien Search	No PST	No GST

Vehicle Loans

Overview

Where can you get a loan?

grandpa 0%
bank 5-7%
dealership too - 0-5%

What loan interest rate can you expect to pay?

between 5-7% if using the bank or credit union.

What is a down payment?

\$ you have saved to make loan smaller.

What are common loan terms?

3 years. but can go as long as 7 years.

How often do you make a loan payment?

monthly but can be bi weekly

What happens if you can't make your loan payment?

eventually, vehicle can be repossessed.

Vehicle Loans

Example 1

You wish to take out a loan for \$15,500 to purchase a used truck. Your monthly payment is \$364 for a four-year loan. Calculate the total paid and the financing charge.

$$\begin{array}{r} \$364 \times 48 = \$17472 \text{ paid} \\ - 15500 \\ \hline \$1972 \text{ finance} \\ \text{charge.} \end{array}$$

Vehicle Loans

Example 2

Moira makes a down payment of \$5000 on a new car she purchases for \$20,703.54. To finance the remaining amount, she takes out a three-year loan at a fixed interest rate of 8.25% annually. The monthly payment for a \$1000 loan at 8.25% is \$31.45.

- a) Calculate the principal for the loan she requires.

$$20703.54 - 5000 = \$15703.54$$

- b) Calculate her monthly payment for the loan.

$$\frac{15703.54}{1000} \times 31.45 = \$493.88$$

- c) Calculate the total paid for the loan.

$$493.88 \times 36 = \$17779.68$$

- d) Calculate her finance charge for the loan.

$$17779.68 - 15703.54 = \underline{\underline{\$2076.14}}$$

- e) Calculate the total cost of the car, including her down payment.

$$5000 + 17779.68 = \underline{\underline{\$22779.68}}$$

Buying a New Vehicle

Overview

Where do you buy a new vehicle?

dealership.

Are there advantages to buying a new vehicle?

- warranty Ex. 3yrs, 60000 km.
- never been used by another.

Are there disadvantages to buying new?

- Cost!
- shortages during Pandemic.

What is the base price?

price before options - rare to pay this.

What is the sticker price?

(base price + options + air cond + freight)
tax.

taxes added to this.

What is 0% financing?

- no interest charged.

Buying a New Vehicle

Example 1

- a) Find the sticker price for the following car: The base price is \$25,880 and it has the following optional equipment.
- A preferred equipment package costing \$1,260
 - An standard transmission costing \$995
 - A stereo upgrade costing \$200
 - Air conditioning tax of \$100 and freight of \$620 will also be charged.
- b) Calculate the cost of the car including taxes.

$$\begin{array}{r} 25880 \\ + 1260 \\ + 995 \\ + 200 \\ + 100 \\ + 620 \end{array}$$

$$\$ 29055 \times 1.12 = \underline{\underline{\$ 32541.60}}$$

Example 2

Dez is going to buy a car with a base price of \$20,798. He adds an option package that costs \$1,585, plus he wants an automatic transmission for an additional \$695. Freight on the car is \$655. The dealership will give him a trade-in allowance of \$5,000 on his old car. There is a documentation fee of \$150. What is the total price he will pay?

$$\begin{array}{r} 20798 \\ + 1585 \\ + 695 \\ + 655 \\ \hline \$ 23733 \\ - 5000 \end{array}$$

$$\$ 18733$$

$$+ 150$$

$$\underline{\underline{\$ 18883 \times 1.12 = \$ 21148.96}}$$

Leasing a New Vehicle

Overview

What is leasing?

sort of like renting a car for 3, 4, or 5 years.

Are there advantages to leasing?

- yes, new car, no repairs, "reliable"
- more "affordable" than financing. (business expense)

What advantage is there to a lease compared to financing a new car?

payments are lower. ↘

Are there disadvantages to leasing?

yes - you give it back at the end.

- pay for damages
 - pay for km over limit
- Ex. 20000 km/yr.
13¢/km over.

What happens at the end of a lease?

two options

- 1) Return.
- 2) buy it.

What is the residual value?

- price you pay at the end of lease to buy.
- called the "buy out".
- tell you this price at the start.

Leasing a New Vehicle

Example 1

The cost of a vehicle is \$34,000 plus taxes. The monthly least payment is \$349 plus taxes for a lease term of 36 months. For this vehicle, a down payment of \$3,850 is required. As well, a refundable security deposit of \$500 and the first month's payment must be made when the lease is signed. The residual value rate is 75% after three years.

- a) Calculate the total monthly lease payment including taxes.

$$\$349 \times 1.12 = \underline{\$390.88}$$

- b) Calculate the total lease payment.

$$\$3850 + (390.88 \times 36) = \underline{\$17921.68}$$

** didn't include security deposit because you get it back.*

- c) Calculate the amount which must be paid at the start of the lease.

$$\begin{array}{r} \$3850 \text{ down payment} \\ + 390.88 \text{ first month} \\ + 500 \text{ security dep} \\ \hline \$4740.88 \end{array}$$

Example 2

For the vehicle in Example 1, the residual value is 75% after 3 years. Calculate the residual value of the vehicle including taxes.

$$34000 \times 0.75 = \underline{\$25500}$$

$$\times 1.12$$

*\$28560
is the
buyout.*

Leasing a New Vehicle

Example 3

For the vehicle in Example 1, at the end of the three-year lease you have the option of returning the vehicle or purchasing it for its residual value.

- a) Calculate the total price you would pay for the vehicle if you purchase it after the three-year lease is over.

$$17921.68 + 28560$$

$$= \$46481.68$$

assuming you get your security deposit back.

- b) How much more did you pay than if you had purchased the vehicle for its "new" price instead of leasing?

$$34000 \times 1.12 = \$38080 \text{ finance price.}$$

$$\begin{array}{r} \$46481.68 \\ - 38080 \\ \hline \end{array}$$

$$\$8401.68 \text{ extra to lease.}$$

Buying a Used Vehicle

Overview

Are there advantages/disadvantages to buying a used vehicle from a dealer?

yes - likely get a good quality vehicle - reputation of dealer.
No - pay more than private.

Are there advantages/disadvantages to buying a used vehicle privately?

Adv - may have maintenance records.
disadv - some sketchy dealers pose as private sellers.

Are there disadvantages to buying a used vehicle?

- can be abused, hidden damages, RUST,
can have a lien.

What is a lien search?

check to see if money is owing on vehicle,
loan or unpaid repair. cost is \$15.00

What is a safety?

- inspection of tires, exhaust, seat belts, suspension,
rust.
- costs \$150-200 - needed to plate vehicle.

What is a rebuild?

- been in an accident, written off, damages more
than vehicle value.
- was fixed, body integrity and safety done.
- says "rebuild" on registration.

* - Ask to see pictures of damage.

Buying a Used Vehicle

Example 1

Les goes to a reputable dealer in Killarney, MB to buy his car. The sticker price for the car is \$5,500. How much will this car cost him?

dealer (pst + gst)

$$5500 \times 1.12 = \underline{\$6160}$$

Example 2

Julie purchases a safetied used car privately for \$2,500. The book value of the car is \$4,000. Before purchasing the car she has a lien search done. How much tax will Julie pay when she goes to an insurance broker to insure her car?

private - PST higher of purchase price or book value

$$4000 \times 0.07 = \underline{\$280}$$

Example 3

Jeff purchases an unsafetied used car privately for \$2,500. The seller says it shouldn't need much, if anything, to pass safety. Before he can license the car, Jeff's new car must pass a safety inspection. Jeff pays \$150 for a safety inspection and the car needs \$1500 of work for it to pass. What are Jeff's options?

- Jeff can walk away spending \$150 if he has not bought the car.
- Jeff can use the \$1500 of work needed to negotiate a lower selling price.
- If Jeff purchased the car unsafetied, he must get it repaired in order to get it on the road.

Vehicle Insurance

Overview

What protection does vehicle insurance provide?

damage from accidents, vandalism, hail, etc.

What is meant by premium?

what you pay per year.

How are insurance rates determined? (4 factors)

location, make + model, deductible, third-party liability.

What are the insurance territories in Manitoba?

map on mpi.mb.ca
rural, WPS, north.

What is a commuter?

drives into WPS for work or school.
higher risk → higher premium.

What payment options do you have?

yearly - one payment
monthly -
quarterly - } interest added on.

Vehicle Insurance

What is the difference between all purpose, pleasure, and layup insurance?

All purpose - work plus everything else
Pleasure - everything except work (4x/month is allowed)
layup - storage insurance for non-driving damage.

What is a claim?

get damage, cost to repair is ~~more~~ more than deductible, make a claim.

What is meant by deductible?

portion you pay, mpi pays the rest.

What is meant by third-party liability?

protection from damages you caused by bad driving (negligence).
get as much as you can if driving in US or carrying passengers.

How can you save money on insurance legally?

- increase deductible
- look forward to increased discount.

Vehicle Insurance

Example 1

You are going to drive your vehicle to work two days a week. What type of insurance should you get?

All purpose.

2 days x 4 weeks = 8x/week.

8 is more than 4.

Example 2

You frequently carry extra passengers with you when going to Neche to pick up parcels. How much third-party liability insurance should you have?

at least \$5 million.

Example 3

You get a stone in your windshield on the highway. Your deductible is \$100. What will it cost you to have your windshield repaired?

\$100, mpi pays the rest.

Example 4

You drive to Winnipeg to take classes at college five days a week. What type of insurance should you have?

Commuter - one who commutes to work from outside the city.

Fuel Economy or Consumption (How much fuel is used)

Overview

What is fuel economy?

measure of fuel used to drive a certain distance.

How is fuel economy measured in Canada?

in litres per 100 km
EX. 15L/100 km.

How is fuel economy measured in the USA?

miles per gallon. - mpg
EX. 19 mpg.

How does fuel economy when driving in the city compare with fuel economy when driving on the highway?

city - uses more fuel - stop and go.
hwy - uses less fuel - steady rate.

What is a typical average size car fuel economy?

possibly 8L/100 km.

Fuel Economy or Consumption (How much fuel is used)

Example 1

A car requires 52 litres of gasoline to fill the tank. If the cost of gasoline is 96.9 cents a litre, calculate the cost to fill the tank.

$$52 \times 0.969 = \underline{\$50.39}$$

Example 2

Calculate the distance travelled in kilometres, given the following odometer readings:

Initial reading: 012862.8 Final reading 013639.7

$$13639.7 - 12862.8 \\ = 776.9 \text{ km.}$$

Example 3

Which vehicle has the best fuel economy?

Vehicle A 8L/100 km

Vehicle B 6.8L/100 km

Vehicle C 11.5L/100 km

uses least number of litres
for 100 km.

Fuel Economy or Consumption (How much fuel is used)

Example 4

A vehicle with a full tank of gas travelled 572 km before stopping at a gas station. If the vehicle requires 41.2 litres of gas to fill the tank, find the fuel economy and the cost of fuel for the trip if the cost per litre is 99.9 cents per litre.

$$\begin{aligned} FE &= \frac{\text{Litres}}{\text{km}} \times 100 \\ &= \frac{41.2}{572} \times 100 = \underline{7.20 \text{ L} / 100 \text{ km}} \end{aligned}$$

Example 5

Gina travelled a total of 350 km in the city, and 200 km on the highway during one week of driving. Her car has a fuel economy of 10.5 L/100 km in the city, and 7.4 L/100 km on the highway. Gasoline costs 98.9 cents per litre. Calculate the number of litres of fuel she used, and the cost of fuel.

$$\begin{array}{l} \text{City} \quad \frac{350}{100} \times 10.5 = 36.75 \text{ L} \\ \text{Hwy} \quad \frac{200}{100} \times 7.4 = 14.8 \text{ L} \\ \hline 51.55 \text{ L} \\ \times 0.989 \\ \hline \underline{\$50.98} \end{array}$$

Vehicle Servicing (Maintenance and Repairs)

Overview

What is servicing?

shop maintains and fixes your vehicle.
Ex. oil change, new tires.

What is the shop-rate?

hourly rate - Ex \$120/hour.

Is labour taxed?

yes, PST + GST.

What are my options, where should I take my vehicle?

dealership, small shop - Someone you trust.

What is the difference between maintenance and repairs?

↙
Scheduled
Smaller
things

↘ Can be more serious
more costly
surprises.

Vehicle Servicing (Maintenance and Repairs)

Example 1

Jane took her vehicle to a car dealership for servicing. The oil and filter were changed, and new wiper blades were installed. The costs of the parts were as follows:

4 litres of oil (\$2.05 a litre)

1 oil filter (\$5.60)

2 wiper blades (\$14.75 a pair)

The time required to service Jane's vehicle was 0.6 hours. The shop reate for labour was \$59.00 an hour. How much is this service going to cost Jane?

$$\begin{array}{r} 4 \times \$2.05 = \$8.20 \\ 1 \times \$5.60 = 5.60 \\ 2 \text{ pr} \times \$14.75 = 14.75 \\ 0.6 \text{ hrs} \times \$59.00 = 35.40 \\ \hline 63.95 \\ \times 1.12 \\ \hline \underline{\underline{\$71.62}} \end{array}$$

Example 2

Some shops have specials on oil changes. Some dealerships offer free oil changes when you purchase a new vehicle. Why might this be?

- bring you back to dealer for other repairs, specials, accessories, etc.
- happy customer = repeat customer.

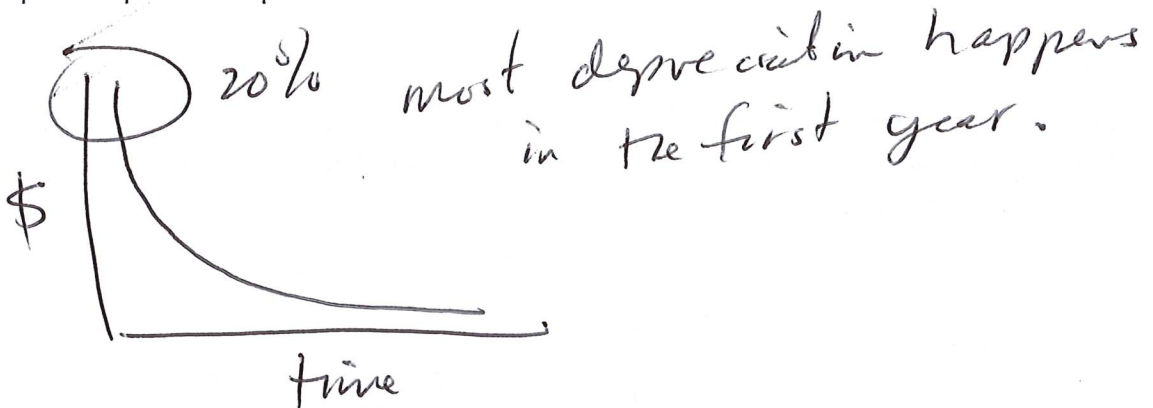
Depreciation (Loss in \$ Value)

Overview

What is depreciation?

loss in value over time

Draw a graph to represent depreciation.



Example 1

A new car is sold for \$35,000. Calculate the depreciation and the car's resale value at the end of the first three years. The depreciation rate is 20% for the first year and 15% for each year after that.

year 1	$35000 \times 0.20 = \$7000 \text{ dep.}$
	$35000 \times 0.80 = \$28000 \text{ value}$

year 2	$28000 \times 0.15 = 4200 \text{ dep.}$
	$28000 \times 0.85 = \$23800 \text{ value}$

year 3	$23800 \times 0.15 = 3570 \text{ dep.}$
	$23800 \times 0.85 = \underline{\underline{\$20230 \text{ value}}}$

total depreciation is \$14770

Depreciation (Loss in \$ Value)

Example 2

What is the total depreciation after three years for the car in Example 1 above?

\$14770

Example 3

Sam purchases a used truck for \$10,500. What will Sam's truck be worth after two years if the depreciation rate is 10% a year? What is the total depreciation after two years? What is the value of the truck after two years?

$$\begin{array}{l} \text{Year 1} \quad 10500 \times 0.10 = \$1050 \text{ dep} \\ \text{value} = 10500 - 1050 = \$9450 \end{array}$$

$$\begin{array}{l} \text{year 2} \quad 9450 \times 0.10 = \$945 \text{ dep} \\ \text{value} = 9450 - 945 = \underline{\$8505} \end{array}$$

$$\text{Total dep} = 1050 + 945 = \$1995$$

$$\text{Value} = \$8505$$