Financial Mathematics Lesson #5: Buying, Renting, and Leasing

Leasing

When **buying** an expensive item, such as a vehicle, the vehicle is purchased with savings, or a loan is taken out with some amount of down payment being made.

An alternative to purchasing an expensive item is to **lease** it. When an item, such as a vehicle, is leased, the monthly payments are made to the leasing company to cover depreciation, taxes, and interest. A major difference between leasing and a loan is that when the loan is paid off, the vehicle is so waned by the purchaser. With a lease, the vehicle is not owned at the end of the leasing agreement, and a "buyout" option is offered.

The **residual value** of a lease is the price at which an item is expected to be sold at the end of its lease (or the amount remaining on the depreciated value of the item). The **residual value** is also sometimes referred to as the **lease-end value**.



- When leasing an item, the GST is calculated on the monthly payment of the lease, NOT on the purchase price of the item.
- When **leasing** an item, **GST** is **also calculated on the deposit** (if any) and then divided by the number of payments in the lease. This is then added to the monthly lease payment. For example, if the deposit is \$3000, then the GST is \$150. If the term of the lease is two years, then $\frac{3000 \times 0.05}{24} = \6.25 . This amount would then be added to the monthly lease

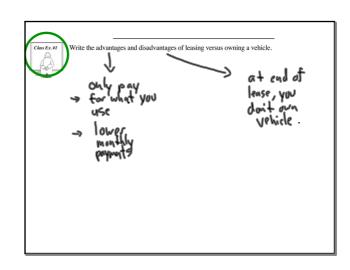
- When purchasing an item with a loan, the GST is calculated on the purchase price of the item, NOT the monthly payment. The monthly payment is based on the loan including GST.
- Note the following points when calculating monthly lease payments with TVM Solver:
- The FU is the residual value, or the lease end value, and is entered as a negative value.

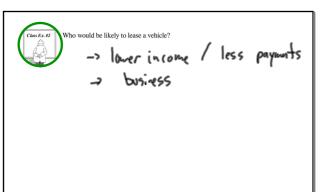
 → PMT = END BEGIN is BEGIN for leases.

 Unless otherwise specified, assume all of the leases to be BEGIN.

 → PMT = END BEGIN is usually the END for loans.

 Unless otherwise specified, assume all of the loans to be END.







The down payment is \$8 000.
The interest rate on the loan is 7.5% p.a., compounded monthly.
Monthly payments are made for three years.

a) What is the total purchase price of the SUV including taxes? = \$33,600

b) What is the amount of the loan?

33,600-8,000 \$25600

c) What is the monthly payment of the loan? 796.32

d) What is the total cost of the SUV if Scott chooses Option 1?

(796.32)(36) 8 000 darget

No down payment is required, but Scott will choose to make a down payment of \$8 000 if he chooses this option.
The lease payment is \$383.14 per month plus GST for three years.
Buyout option is \$15.865.72

GST 5%

e) What is the monthly lease payment including taxes (363.14) (1.05) 9413.4 36

f) What is the total of the lease payments over the three years?

(413.41)(36) 14882.76

g) What is the residual value of the SUV? \$ 15 865.72

h) What would the total cost of the SUV be if Scott decided to choose Option 2 and purchase the vehicle at the end of three years?

\$38 748.48

Consider the scenario in Class Example #3.

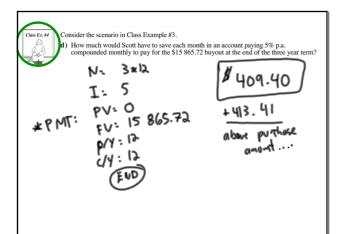
a) How much does Scott spend in total on monthly payments over the term of the financing for each option? Explain the difference between the two amounts.

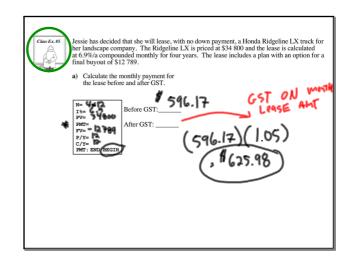
36 (796.32)= 28667.52 14 882.76

sider the scenario in Class Example #3.

c) What is the difference between these two totals? Explain this difference.

1 + ase: 38748.48 purclase: - 36667.52 1 2080.96 more to lease







Jessie has decided that she will lease, with no down payment, a Honda Ridgeline LX truck for her landscape company. The Ridgeline LX is priced at \$34 800 and the lease is calculated at 6.9%/a compounded monthly for four years. The lease includes a plan with an option for a final buyout of \$12 789.

b) Jessie has decided that the monthly payments are too high and she would like to pay only \$375 per month, not including GST. Calculate the new final buyout, or residual value, of the lease.



25 044.77

Renting a House

Unlike leasing, there is NO option to buy or purchase the service or item.

Common expenses when renting a home are:

- rent
 hydro/electric
 insurance
 water/utilities

Buying a Home with a Mortgage

Most people who buy a house borrow money in the form of a mortgage from a bank because they do not have the cash to pay for it (see Lesson 4 of this unit to review term, amortization, and TVM Solver).

To receive a mortgage, one must have a down payment; usually 10% of the purchase price is the standard.

To calculate the **price range one can afford for a mortgage**, financial analysts suggest that the maximum allowable mortgage should **NOT exceed 28% of total gross monthly income** (source: First Financial Mortgage Corp., http://www.kchomeloans.com/calculator/). Others suggest 36% of your monthly gross income, less any long term obligations.

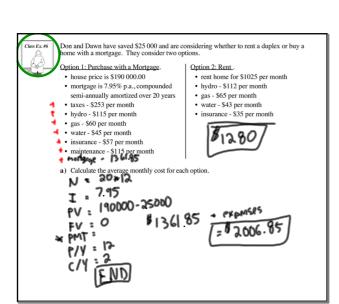
Buying a Home with a Mortgage

For our purposes, we will use the maximum allowable mortgage, i.e. up to 28% of total gross monthly income.

Remember, by Canadian law, mortgage interest must be calculated annually or semi-annually. We assume mortgages to be compounded semi-annually.

Common expenses when owning a home are:

- taxes
 hydro/electric
 gas
 water/utilities
 maintenance
 insurance



 $\boldsymbol{b)} \ \ \text{Based on the monthly average cost, list an advantage and a disadvantage of both options.}$ advertage -> purhasing ... our house -> renting... less