GRADE 12 - ESSENTIAL

Name: _____

UNIT B – VEHICLE FINANCE – REVIEW

Date: _____

- Use Loan tables for loan payments (you may check them with an – on-line App or on your phone).
- Assume all purchases (except gasoline) of goods and services have a retail sales tax applied of 5% GST and **7% PST** (our PST went down to 7% on July 1st 2019). [Gasoline has a perplexing tax structure that includes a city tax, a special excise tax, and then we pay tax on tax, .. Consequently, the posted price of gas at the pump includes all taxes already]
- Round money of course to the nearest $0.01.

BUYING A VEHICLE

1. Petra wants to buy a used Ford Mustang for $21,000 plus PST (7%) and GST (5%). She has $3,000 for a down payment and must take out a loan to pay the remaining balance with monthly payments. The bank charges 5% interest APR compounded monthly and the loan must be repaid in 3 years (an 'amortization period' of 3 years).

    a) Determine the principal amount of the loan.
    b) Calculate her monthly payment [using tables, check with an App if you want].
    c) Calculate the amount of interest that Petra pays over the entire period of the loan.

2. The total cost of purchasing a new vehicle (including all the options and freight and excise and eco taxes, etc) is $31,743.00 plus 7% PST and 5% GST. Terri is buying the vehicle with a $3,500.00 down payment and a loan to finance the remaining balance. The interest rate on the loan is 8% APR compounded monthly, and Terri agrees to repay the loan in five years.

> a) Determine the amount of the loan.
> b) Calculate the amount of each monthly payment. [Use an App or website if you want, but show a hand-drawn screen shot]
> c) Determine the full total cost of buying the vehicle.
> d) How much interest did Terri pay to finance the vehicle?
> e) How much would her monthly payments be if she had shopped around and found a bank that would give her a three-year loan at 8% compounded monthly? How much total would she save by paying off the loan in three years instead of 5 years?

3. Ted wants to buy a new pickup truck priced at $42,699.00 (including all the options and freight and excise tax, etc) plus 7% PST and 5% GST. He uses his $12,000.00 truck as a trade-in and he also applies a $5,000 down payment. He takes out a three-year loan with monthly payments at 6.5% compounded monthly for the loan [remember to apply the taxes *after* the trade-in].

      a. What is the amount of each monthly payment? [use tables and check with an App if you want]

      b. What is the net total cost of the truck to Ted if he has given his trade-in and down payment?

LEASING A VEHICLE

4. An extended cab truck leases for $359 per month plus retail taxes (7% PST and 5% GST) for a lease term of 36 months. A down payment of $4,000 is required. Calculate the total amount paid on the lease.

5. The extended cab truck in question above had a sales price new of $38,000. The residual value on the lease agreement is documented as 70% of the original price new after the three years (assuming it has not been damaged or driven beyond the permitted distance).

    a) Calculate the residual value at the end of the lease [the value of a vehicle does not include taxes!]

    b) Calculate the total cost if the truck is purchased outright with cash at the end of the lease (of course retail sales tax [PST & GST] must still be applied to this buyout as well).

6. Ali is planning to lease a two-door sedan that sells for $18,900 plus retail sales taxes (PST & GST) if bought. The monthly lease payment however is $227 plus retail sales taxes for a term of 48 months. A down payment of $2,000 is required. At the end of the lease Ali plans to buyout the sedan and finance it at a 5% interest rate for 3 years. The residual value is 55% of the original value of the sedan.

      a) Calculate the total cost of the 48 month lease.

      b) Calculate the total cost to finance the buyout of the sedan (and of course Ali will need to pay the retail sales taxes as well when he does the buyout).

      c) Calculate the total amount Ali will have spent on the sedan including the lease costs, the financing costs and the down payment.

FUEL AND MAINTENANCE AND INSURANCE

7. The odometer of a mid-size car reads 36,019 at the beginning of a trip and 36,153 at the end of the trip. The car consumes 12.7L of gasoline during the trip.

    a. Determine the fuel economy (L/100km) of the sedan.

    b. If the cost of gasoline is $1.179 per litre, find the cost of driving on 500 km road trip.

8. The fuel economy of a two-door convertible is 9.2L/100 km.

    a. How many litres of gasoline are required to drive 20,000 km?

    b. If the cost of gasoline averages $1.239 per litre, find the cost of driving the convertible 20,000km.

9. Find the total cost of servicing a vehicle that requires two headlights at $68.25 each, an exhaust pipe at $233 and a muffler at $105.50. The time required to service the vehicle is 2 hours 15 minutes and the rate the service station charges for labour is $120 per hour. Of course, the normal retail taxes are applied to **all** goods and to all services! [although in reality a few things are tax exempt, and a few things may have extra taxes]

10. A minivan sells for $37,500 and leases for $375 plus taxes per month for a lease term of 24 months. A down payment of $3,000 is required. The residual value according to the lease agreement will be 64% of the selling price (provided you have not ruined the car or exceeded the lease kilometer limit) which equates to a depreciation of exactly 20% per year.

     a. Calculate the value of the depreciated minivan after two years according to the lease agreement.

     b. The Kelly Blue Book valuation guide says that this particular vehicle actually depreciates at 30% per year! What is the value of the car after 2 years based on this rate of depreciation.

     c. Graph the situations(above). Graph the value of the mini-van according to the dealer at 20% per year depreciation and according to the Blue Book at 30% per year. Graph them both for 12 years.
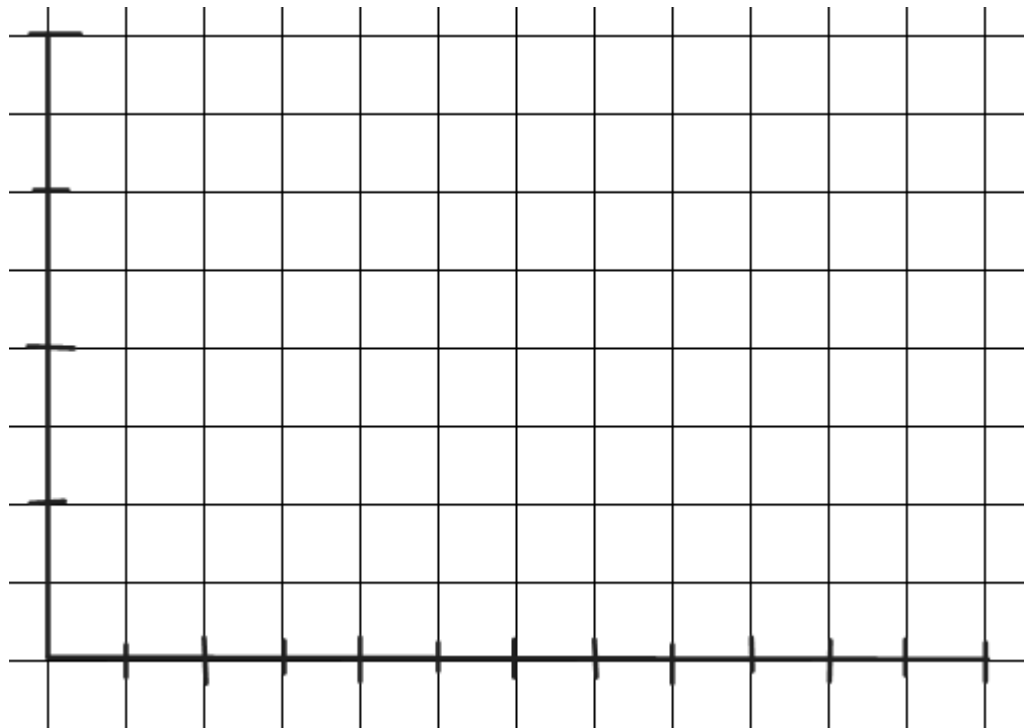
11. Kennedy purchases a used sports car for $23,500 (plus taxes) on December 31, 2014. During the year 2015, he drives 18,000 kilometres. The fuel consumption of the sports car is 9.7L/100km and his average cost of gasoline during the year is $1.14 / L. The rate of depreciation of the value of his vehicle is 25% per year.

     a. Calculate the Kennedy's cost of gasoline consumed for the year 2015.

     b. Calculate the value of the sports car on December 31, 2018.

12. The Jackson's are planning a vacation in which they will drive a distance of 4,200 km. The fuel consumption rate ['fuel economy'] for their vehicle is 13.1 L/100km. The family estimates that the cost of gasoline during their vacation will be $1.18 / L. Calculate the cost of gasoline to fuel the vehicle for the vacation.

TDSR

13. Debbie pays rent of $850 per month (includes heat, water, electricity). She has a monthly cell phone bill of $240. Those are her main mandatory expenses. She has a gross annual income of $38,000. She is thinking of financing a car that will cost $149 bi-weekly. She has a small down payment so she thinks she should be able to afford $149 bi-weekly.

     a. determine Debbie's TDSR (Total Debt Service Ratio)
     b. Explain if the bank is likely to loan Debbie the money.
     c. Explain what Debbie do to improve her situation?

COMPARE BUY VS LEASE

14. Reece is planning to either buy or lease a new vehicle. She has $4,000 available for a down payment and she is interested in an SUV that has a purchase price of $34,499.00 plus PST and GST. Whether she buys or leases she wants to own the vehicle at the end of 5 years. If she buys the SUV outright, she can obtain a loan to finance the purchase at 5% for 5 years. If she leases, her monthly contractual leasing payment will be $395.00 (which includes taxes) for 36 months and she will finance the residual amount at 5% interest for 2 years. The residual value of the SUV is $20,999.00 plus she will need to pay the taxes when she buys it outright.

    a. What is the total cost of buying the vehicle?
    b. What is the total cost of leasing the vehicle and then buying it outright?
    c. What advice would you give to Reece to help her with her decision

LOAN TABLE. Monthly rate per thousand $ borrowed.
Based on Compounded Monthly Compound Interest
Or see related loan tables that cover higher periods and higher rates.

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
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

Example A. 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 payments of $732.30 so a total of $35,150.40 in payments. So, your $30K loan cost you $5,150.40 in extra interest.

Interpolation. What if you have **5.8%** interest rate? You need to '*interpolate*', find a value in-between two given values. Example: to find 5.8% at 5 years we know the monthly amount for the table is between $18.87 and $19.33. So, it goes up $0.46 for every 1%, which means it goes up $0.046 for every 0.1%. So, for 0.8% it goes up 0.37 for 0.8%. So, the payment for 5.8% is **$10.61 + $0.39 = $11.00**.

$$\frac{\Delta\$}{\Delta\%} = \frac{\$19.33 - \$18.87}{1\%} = \frac{0.46}{1} = \frac{x}{0.8}; \quad x = 0.37$$

An increase of 0.8% beyond 5% is an increase of $0.37 in payment beyond $18.87. So, $18.87 + $0.37 = $19.24. So, at 5.8% interest rate your table entry is **$19.24**,

I used an **App** for the loan calculations, so your monthly payments, if you use tables, should be within a few cents and total costs within ~ $10 or $20.

If you suspect an error let me know! I make booboos too with all these crazy numbers.

1a. $20,520   b. $614.98/month   c. $1,618.28 Interest

2a. $32,052.16   b. ~649.90 [Using an App]
c. Full cost of buying: ~$42,494.00   d. Paid $6,941.84 interest.
e. Payments ~1,004.40/month if she pays off loan in 3 years   She saves $2,850 if pay off more quickly in 3 years instead of 5.

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3. a. ~$900.56 per month payment
b. ~49,420.16 (including truck value he traded in)

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4. Lease Cost = $18,474.88

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5. a. $26,600 (sounds a bit suspicious! Only about 11% annual depreciation!?)
b. $29,792 buyout at end of lease plus the $18,474.88 for the lease = $48,266.88 for total lease plus buyout.

6a. $14,203.52 lease   b. $11,215.80 total payments on loan
c. total spent on lease and buyout and down payment: $25,419.32.

7a. 9.48 L / 100 km but usually fuel efficiency is shown on stickers as one decimal place so 9.5 L / 100 km is ok too
b. $55.89 for a 500 km road trip

8a. 1,840 L to drive the 20K km.
b. ~$2,279.76 to drive the 20K Km.

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9. Final bill: $834.50

10a. $24,000 residual value according to lease agreement
b. ~$18,375 depreciated value according to the Kelly Blue Book!
(Something suspicious here! The car residual should be closer to the Kelly Blue Book amount)

11a. $1990.44   b. $17,625 (*careful!* the value of a car does not include the taxes on it!)

12. $649.24 for gas for their vacation

13a. TDSR = 54.8% b. she will not get a loan (not from any respectable loaner at least) since her TDSR is more than 40%. [! There are companies that will loan you money even if you cannot afford it! Stay away from them !]
c. she could get another job or better job, she could get a roommate to share the rent, she could make a bigger down payment, get money from parents, etc.

14. a. ~$43,220   b. ~$42,983.44

c. Advice. Be careful leasing if you drive over the allowed distance. But the nice thing about lease is you rent and if you really like the vehicle, you can then buy it out. If you do not like it then you can just lease a different one, but then of course you will have another 3 years of payments instead of actually ever owning a vehicle.