Grade 12 Essential
Week 2 Quiz Debrief

CAR FINANCE week2

Date: _____

OPEN Book
This one TIME
use "cheat
sheet"

Tweak up the
cheat sheet
eventually
with what
you want...

Use your or my doubled – sided study notes (cheat sheet) to its full effect.
    Use a calculator to its full effect.
Show work for best mark
    Round decimal answers to nearest 0.01
Each individual question is worth 2 marks each
    Show work for best mark (better marks if you make a brain fart and
    easier for you to organize your thoughts)
Formulae and tables are provided

    Put a check mark here: ☐ if you read these instructions
Show work on separate paper if necessary

1. Complete the table converting different periodic amounts (Grade 11)

$145 bi-weekly	=	_____ / year
$42,500 / year	=	_____ monthly
$930 / week	=	_____ / month

Work Area:

6

VEHICLE FINANCE

Final New Vehicle Price = (**Dealer price** after eco fees, freight, options, etc – **Trade in**)* tax factor

Vehicle Finance. TDSR (Total Debt Service Ratio) = $\frac{Debts\ and\ Expenses(monthly)}{Total\ Gross\ Income\ (monthly)} * 100$; max 40%

Cannot have more than 40% of your gross income going towards debt and mandatory payments.

Monthly Amount = Weekly Amt * 52 / 12 = BiWeekly Amount *26 / 12

Exponential Decay (depreciation) of a car's value:

Final Value = Original Value * (1 - annual depreciation rate)^{years}. Original Value does not include taxes. Eg: $30,000 * 0.85^{12 years} = $4267.25 for 15% depreciation after 12 yrs

Monthly Loan Payment = $table\ value * \dfrac{borrowed\ amount}{1,000}$

Overall Cost of Car = Total Loan Payments + Down Payment

Interest Paid = Total Loan Amount Paid Back – Amount Borrowed

One year = 52 weekly periods = 26 bi-weekly periods

Fuel Economy expressed as ratio: $\dfrac{How\ many\ litres\ used}{100km}$; **Example:** $\dfrac{31L}{390km} = \dfrac{x\ L}{100}$, where x is the consumption of fuel for 100km. Should be somewhere *around* 8 to 12L/100 for a normal family car!

Time. 1hr 45min = 1hr + 45/60hr = 1.75 hrs; 3hr20min = 3+20/60 = 3.33 hrs

Fuel Prices at pump already include taxes!!

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1. Complete the table converting different periodic amounts (Grade 11)

a)			
$145 bi-weekly	=	$3,770 / year	
$42,500 / year	=	$3,541.67 monthly	
$930 / week	=	$4,030 / month	

Grade 10
& 11 stuff
(Conversions)

Work Area.

6

a) $\dfrac{\$145}{\text{bi-week}} \cdot \dfrac{26 \text{ bi-weeks}}{1 \text{ year}} = \left(\dfrac{\$3,770}{\text{yr}}\right)$
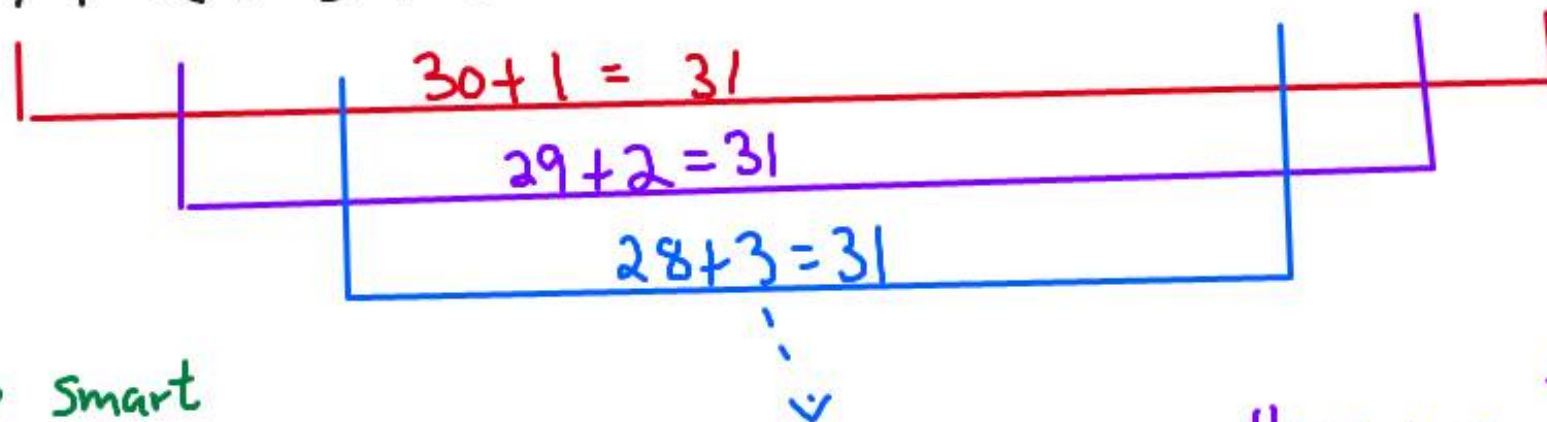
b) $\dfrac{\$42,500}{\text{yr}} \cdot \dfrac{1}{12} \dfrac{\text{yr}}{\text{mon}} = \left(\dfrac{\$3541.67}{\text{mon}}\right)$

c) $\dfrac{\$930}{\text{wk}} \cdot \dfrac{52 \text{ wk}}{1 \text{ yr}} \cdot \dfrac{1}{12} \dfrac{\text{yr}}{\text{month}} = \left(\dfrac{\$4030}{\text{month}}\right)$

2. **Problem Solve.** Determine the sum of the numbers from 1 to 30.

2

$$1 + 2 + 3 + 4 + + + etc +++ \quad 27 + 28 + 29 + 30 =$$

$$30 + 1 = 31$$

$$29 + 2 = 31$$

$$28 + 3 = 31$$

Some smart
cookie a
few thousand
years ago
noticed the pattern!

How many "31"s?

15!

$$31 \cdot 15 = \boxed{465}$$

$$\sum_{n=1}^{30} n$$

we will write
it like this soon!

ANOTHER SMART COOKIE
🌎

3. Karen earns **$3,800** gross per month at work plus she gets a tax free Canada Child Benefit of **$450/month**. She pays rent of **$150/week** to her mom. (No taxes necessary). She pays **$700 monthly** for day care (day care services are *not* subject to a retail sales tax). She is thinking of financing the purchase of a car through a local dealership for a loan with bi-weekly loan payments of **$139** for 7 years.

    a. calculate her Total Debt Service Ratio (TDSR) if she takes the loan.
    b. State whether she is likely to get the loan.
    c. **Bonus**. What other factors might affect Karen regarding her personal finances? List and **explain** at least two.

a) $$TDSR = \frac{(650 + 700 + 301.17)}{(3,800 + 450)}$$

← can she afford extra debt?

$\frac{\$150}{week} \cdot \frac{52\,wk}{1\,yr} \cdot \frac{1\,yr}{12\,mon} = \frac{\$650}{month}$

$$= \frac{1651.17}{4,250} = 0.3885.... = \boxed{38.85\%}$$

b) She can afford the extra debt (for now) since ≤ 40%

oops!

* Everything per month

$\frac{\$139}{biweek} \cdot \frac{26\,biweek}{1\,yr} \cdot \frac{1\,yr}{12\,month} = \frac{\$301.17}{month}$

c) mom moves?
Another baby?
Get a roommate?

Formulae:

$$TDSR = \frac{Total\ Compulsary\ Debts}{Total\ Gross\ Income} * 100;\ max\ 40\%\ for\ a\ loan$$

4. **Car Finance**. The car you chose costs **$34,500** MSRP (Manufacturer's Suggested Retail Price). You want the fancy stereo system option for an extra **$600**. The car has to be shipped from Toronto and incurs a freight charge of **$750**. There is an ecology 'fee' (excise tax) of **$100** on its air conditioner. You have **no trade-in** vehicle. You will finance the purchase and put a down payment of **$2,000**.

a. Determine the price of your car with the options and freight and ecology 'fee'. $34,500 + 600 + 750 + 100 = \$35950$ for car

b. Calculate the final cost of the car with taxes included. (7% PST and 5% GST) $35,950 \cdot 1.12 = \$40,264$ with taxes

8

c. You make the down payment of $2,000 and then take a loan on the remainder at **8%** for **5** years. Calculate your monthly payments using your loan tables. Check with an App if you want.

$$\$ \ 20.28 \cdot \frac{38,264}{1,000} = \$775.99 \ \text{per month}$$

$$40,264 \ \text{OWING}$$
$$- \ 2,000 \ \text{Down}$$
$$\overline{38,264} \leftarrow \text{To Finance with loan}$$

d. How much total do you end up paying for the car with the monthly payments and the down payment?

$$\$775.99/\text{month} \cdot 60 \ \text{months}$$

$$= \$ 46,559.40 \ \text{payments total}$$
$$+ \ 2,000.00 \ \text{down pmt}$$
$$\overline{\$48559.40} \quad \text{for a 34.5K car!}$$

Present Value	38,264
✓ Payments	-775.86
Future Value	0
Annual Rate (%)	8
Periods	60
Compounding	Monthly

Monthly Vehicle Loan Payments
per Thousand Borrowed

← ! for every 1,000 borrowed

Interest Rate	Years to Repay Loan						
	1	2	3	4	5	6	7
4.00%	$85.15	$43.42	$29.52	$22.58	$18.42	$15.65	$13.67
4.25%	$85.26	$43.54	$29.64	$22.69	$18.53	$15.76	$13.78
4.50%	$85.38	$43.65	$29.75	$22.80	$18.64	$15.87	$13.90
4.75%	$85.49	$43.76	$29.86	$22.92	$18.76	$15.99	$14.02
5.00%	$85.61	$43.87	$29.97	$23.03	$18.87	$16.10	$14.13
5.25%	$85.72	$43.98	$30.08	$23.14	$18.99	$16.22	$14.25
5.50%	$85.84	$44.10	$30.20	$23.26	$19.10	$16.34	$14.37
5.75%	$85.95	$44.21	$30.31	$23.37	$19.22	$16.46	$14.49
6.00%	$86.07	$44.32	$30.42	$23.49	$19.33	$16.57	$14.61
6.50%	$86.30	$44.55	$30.65	$23.71	$19.57	$16.81	$14.85
7.00%	$86.53	$44.77	$30.88	$23.95	$19.80	$17.05	$15.09
7.50%	$86.76	$45.00	$31.11	$24.18	$20.04	$17.29	$15.34
8.00%	$86.99	$45.23	$31.34	$24.41	$20.28	$17.53	$15.59
10.00%	$87.92	$46.14	$32.27	$25.36	$21.25	$18.53	$16.60
15.00%	$90.26	$48.49	$34.67	$27.83	$23.79	$21.15	$19.30

BMO ⓜ

Loan amount ⓘ

$38,264

Enter the total amount you want to borrow.

Payment frequency ⓘ

Monthly ⌄

How often would you like to make payments?

Interest rate

8.00%

Enter an interest rate.

Amortization ⓘ

5 years ⌄

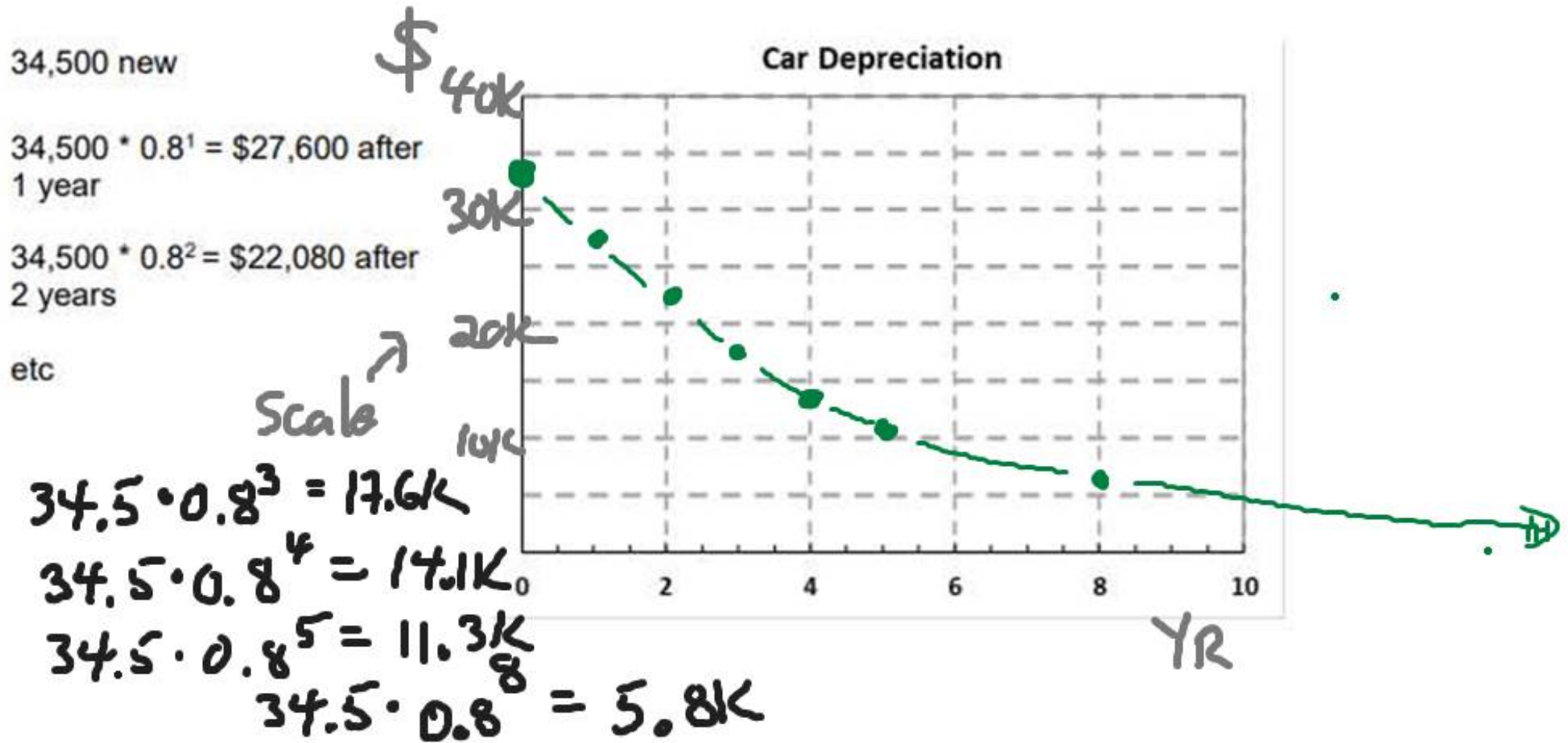Select the number of years you'll need to pay back your loan.

Your estimated monthly loan payment

$776

Every Bank website has a loan calculator!!!

e. **BONUS**. You wonder what your car will worth after **8** years (approximately) in case you want to trade it in then for a new one. The model you bought depreciates in value at **20%** per year, year on year (exponential decay), from its original new MSRP value. Determine the value of your car after the **8** years. (*caution*: the original *value* of the car is just the MSRP, all the extra options and shipping and taxes you paid do not really add much value to the car years later)

f. Graph the depreciation: (Grade 11 Graphing)

34,500 new

$34,500 * 0.8^1 = \$27,600$ after 1 year

$34,500 * 0.8^2 = \$22,080$ after 2 years

etc

Scale ↗

$34.5 \cdot 0.8^3 = 17.6K$

$34.5 \cdot 0.8^4 = 14.1K$

$34.5 \cdot 0.8^5 = 11.3K$

$34.5 \cdot 0.8^8 = 5.8K$

Car Depreciation

$40k

30K

20K

10K

0   2   4   6   8   10   YR

BONUSES (two marks each if you need them)

1. **Simplify:** Show manual work! Even if you just draw it! Or just a use a calculator if you really must.

a. $2\frac{1}{4} * 5 =$ $11\frac{1}{4}$

b. $2\frac{7}{8} - 2\frac{1}{4}$

$2 + \frac{7}{8} - \left(2 + \frac{1}{4}\right)$

$= 2 + \frac{7}{8} - 2 - \frac{1}{4}$

$= \frac{7}{8} - \frac{1}{4}$

$= \frac{7}{8} - \frac{2}{8} = \boxed{\frac{5}{8}}$

$2\frac{7}{8} - 2\frac{1}{4}$

$= \frac{5}{8}$

or use calculato

2. **Convert:** Determine the number of minutes in eight weeks

$8 \text{ wk} \cdot \dfrac{7 \text{ day}}{1 \text{ wk}} \cdot \dfrac{24 \text{ hr}}{1 \text{ day}} \cdot \dfrac{60 \text{ min}}{1 \text{ hr}}$

$= 8 \cdot 7 \cdot 24 \cdot 60 = 80{,}640 \text{ min}$

That is it

the quiz for week 2

Don't miss too
many
They are
~ 15% of course
mark!!

↗
approx