Teacher's GRADE 12 ESSENTIAL – STUDY NOTES (Cheat Sheet)

My *Study Notes (cheat sheet) Do your own, or copy these out, or add to them!*

To Evaluate expression: BEDMAS order of operations (Brackets, Exponents, Mult & Divide, Add & Sub)

Algebra: work backwards, (un-evaluate, un-BEDMAS, reverse order)

Problem Solve: Guess and Check, Work Backwards, Use a Formula, Draw Diagram, Use Logic, Use a Table, Make a List and Count, Find a Pattern, Act it out (model it), etc….

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 = $table\ value * \frac{borrowed\ amount}{1{,}000}$

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: $\frac{How\ many\ litres\ used}{100km}$**; Example:** $\frac{31L}{390km} = \frac{x\ L}{100}$, 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!!

STATISTICS

Mean. $\bar{x} = \frac{\sum x_i}{n}$**;** sum up all the data and divide by the data set size, **n**

Weighted Mean: $\frac{\sum(x_1 * wf_1 + x_2 * wf_2 + x_3 * wf_3 + ++)}{(wf_1 + wf_2 + wf_3 + ++)} = \frac{\sum x_i f_1}{\sum wf_i}$

Median, $\tilde{x}$. Line data up in ascending order, find the data value at the middle place.

Middle place = $\frac{(n+1)}{2}$. Eg: n= 17 data → middle place is the 9th place. With 20 data → middle place is the mean between the 10th and 11th place, value in 10 and a 'halfth' place.

Percentile Rank. **PR** = $\frac{B + {}^{1}/_{2} E}{N} * 100$;round up!; where **B** is the number of scores below, E is the number equal; and **N** is the total number.

Percentiles and Quartile Ranks. **$P_{25} \equiv Q_1$; $P_{50} \equiv Q_2 \equiv$ Median; $P_{75} \equiv Q_3$.**

Note: some references simplify this too $\frac{B}{N} * 100$ if N is large or E is small.

HOUSE FINANCE

Gross Debt Service Ratio.

$$GDSR = \frac{Monthly\ Mortgage + Monthly\ Property\ Taxes + Monthly\ Heating\ Cost}{Gross\ Monthly\ Income} * 100;$$ max 32%

Cannot spend more than 32% of your gross income on a house, shelter.

Property Tax

Portioned Assessment = Property Assessment *Portion Percentage

Property Tax = Portioned Assessment * Mill Rate(s) + [Special Levies + Frontage Levies]

Mill Rate **=** $\frac{City\ Revenue\ Required}{Total\ portioned\ value\ of\ Properties} * 1000$**,** a Mill is a per thousand

Property [municipal] tax pays for: Police, Fire and Paramedics, snow removal, pest control, lights,

School mill rate tax is separate on same bill, done by school board, same calculation method.

~\$800 to \$6,000 combined annual.

PROBABILITY

Prob of Event A = $\frac{favoured\ outcomes}{total\ possible\ outcomes}$

Odds in Favour (For). Favoured **:** Unfavoured ; {wins **:** no wins}; (success **:** failure}

Odds Against. unfavoured **:** favoured

Eg 30% prob = 3/10 prob = 0.3 prob → *3:7* Odds in Favour → *7:3* Odds Against.

Expected Value:

EV = P(win)*$Net Gain – P(lose)*$Loss; if negative you lose that amt *on average* every play. Occasionally you may have multiple prizes:

EV = [P(win$_1$)*$Net Gain$_1$ + P(win$_2$)*$Net Gain$_2$] – [P(lose)*$Loss]

GEOMETRY AND TRIGONOMETRY

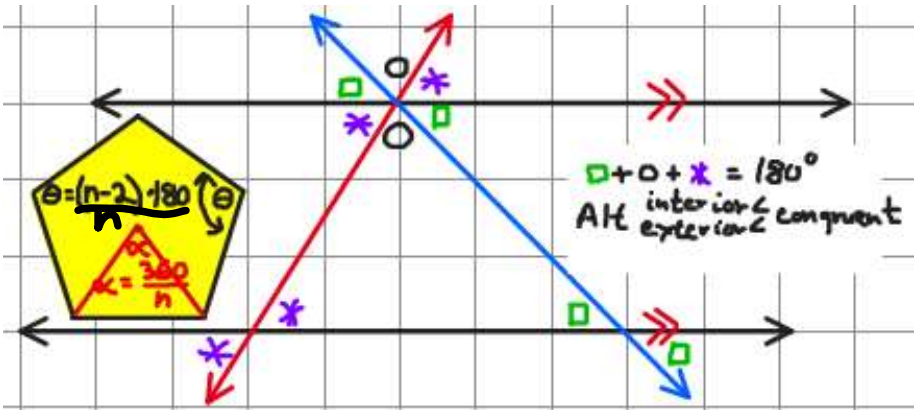
Sum of Interior Angles of a Polygon; **S = (n – 2) * 180°**; where n is the number of sides of the polygon

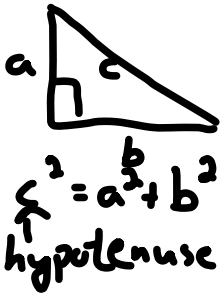
Central Angle of Regular Polygon Sector; **C**

$C = \frac{360^\circ}{n}$; where n is the number of sides.

Number of Diagonals in a Polygon; **D**

$D = \frac{n(n-3)}{2}$; where n is the number of sides.





SOH CAH TOA for Right Angle Triangles

Sin A = $\frac{Opp\ to\ A}{Hypotenuse}$**; cos A =** $\frac{Adj\ to\ A}{Hypotenuse}$**; Tan A =** $\frac{Opp\ to\ A}{Adjacent\ to\ A}$**;** **Pythagoras: c² = a² + b²**

Trigonometry Cosine Law:

Cosine Law for side ***a*** across from angle **A**: **a² = b² + c² – 2*b*c*cos(A); etc**

Cosine Law for angle **A** given three sides: **Cos(A) =** $\frac{b^2+c^2-a^2}{2bc}$; etc

Trigonometry Sine Law:

$\frac{a}{\sin A} = \frac{b}{\sin B} = \frac{c}{\sin C}$ or $\frac{\sin A}{a} = \frac{\sin B}{b} = \frac{\sin C}{c}$

Geometric Formulae: $Circumference = \pi * d = 2\pi r$

Area: Rectangle and Parallelogram = b*h; $A_{\Delta} = \frac{1}{2} * b * h$; $Area_{circle} = \pi r^2$

SA$_{Prism}$= sum of face areas; SA$_{cylinder}$ = $2\pi r^2 + 2\pi rh$

Volume: $Vol_{prism} = Base_{arae} * h_{prism}$; $Vol_{cyl} = \pi r^2 h$

Tax Rates:

PST : 8% (recently 7%) ; GST : 5%

Pay taxes every time you spend money!