GRADE 11 ESSENTIAL – BASIC REFERENCE NOTES

*A **basic selection** of Grade 11 Essential Concepts and Formulae. Of course **you** are likely to have more and to have examples on **your** doubled-sided study sheet.*

Algebra. If y = ax + b, then x = $\frac{y-b}{a}$

Proportions, solve by cross multiply (lazy algebra): If $\frac{x}{a} = \frac{b}{c}$; then $x = \frac{ab}{c}$

Interest and Credit

A = P + I, the Final **A**mount an investment or loan is worth is the **P**rincipal plus the **I**nterest earned or owing.

Simple: **I = P*r*t**; where **I** is the Interest [$], **P** is Principal [$], **r** is yearly Annual Percentage Rate (APR)[%], and **t** is time in **years**. *Hint!!*: 3 months = 3/12^{ths} or 0.25 of a year, etc!

Compound: $A = P * \left(1 + \frac{r}{s}\right)^{n*s}$; where **P** is Principal [$], **r** is the **yearly** interest rate as a decimal (*eg: 8.5% = 0.085*), **s** is the number of periods per year the interest is compounded, and ***n*** is the time in **years**.

Periods: *Monthly*: **s** = 12. *Quarterly*: **s** = 4. *Semi-Annual*: **s** = 2. *Weekly*: **s** = 52. *Bi-Weekly*:**s** = 26; etc

Simple and Compound Interest pretty are very close over short period or low interest rate. Much better to pay off a loan monthly rather than at end of loan term!

Monthly Loan tables: ***payment amounts in table are for each thousand you borrow***
(loan tables will be provided)

Geometry

Formulae .You will have a separate substantial and familiar sheet of **Geometry Formulae** provided.
Conversions. You have a separate substantial and familiar sheet of unit **Conversion Factors** provided.

Names of shapes: **prisms**: rectangular faces joining edges of two congruent **base shapes**; **pyramids**: triangles faces connected to edges of **base shape** and meeting at a point.

Statistics

Circle Graph (Pie Chart) size of Sector (Slice): n% of a full circle of 360°= $\frac{n}{100} * 360^{o}$

Line Graph, Bar Graph, Histograms: **Category** (independent variable) along bottom axis, **Frequency (**Count) (dependent variable) along vertical axis. Frequency *must be percent* of total if multiple bar graph! (eg: comparing sample of 25 girls with sample of 50 boys)

Relations and Patterns

slope = $\frac{rise}{run} = \frac{change\,in\,y}{change\,in\,x} = \frac{\Delta y}{\Delta x} = \frac{y_2 - y_1}{x_2 - x_1} = 'm'$

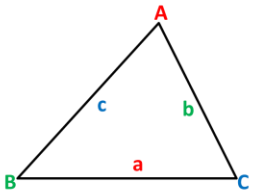
equation of a line: **y = mx + b;** '*b*' is where the line intercepts the vertical y-axis

*This is **teacher's** very basic 'reference notes', hopefully **your own** are more detailed with examples and explained in **your** own style. You may want to add some fractions, prior grades , etc also!*

MrF

TRIGONOMETRY

!! make sure calculator in degree mode !! or use trig tables



Trigonometry Cosine Law:

Cosine Law for *side* ***a*** across from angle A: $\mathbf{a^2 = b^2 + c^2 - 2*b*c*\cos(A)}$

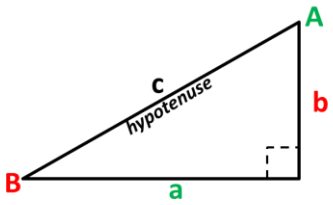
Cosine Law for *angle* **A** given three sides: $\cos(\angle A) = \frac{b^2 + c^2 - a^2}{2bc}$ or $\angle A = \cos^{-1}\left(\frac{b^2+c^2-a^2}{2bc}\right)$

Various arrangements of formula: $\mathbf{a^2 = b^2 + c^2 - 2*b*c*\cos(A)}$
$\mathbf{b^2 = a^2 + c^2 - 2*a*c*\cos(B)}$; **or** $\mathbf{c^2 = a^2 + b^2 - 2*a*b*\cos(C)}$

Trigonometry Sine Law:

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

[Grade 10] SOH CAH TOA for right triangles only



$$sin\angle B = \frac{side\ opposite\ B}{hypotenuse} = \frac{b}{c};\ cos\angle B = \frac{side\ adjacent\ to\ B}{hypotenuse} = \frac{a}{c};$$

$$tan\angle B = \frac{side\ opposite\ \angle B}{side\ adjacent\ to\ \angle B} = \frac{b}{a};\ \angle B = \tan^{-1}\left(\frac{b}{a}\right) = \sin^{-1}\left(\frac{b}{c}\right) = \cos^{-1}\left(\frac{a}{c}\right)$$

[Grade 10] Pythagorean Theorem (right triangle only):
$\boldsymbol{c^2 = a^2 + b^2}$**; if c** is the hypotenuse (longest side)

Design

Scale ≡ model size : actual size = $\frac{model\ size}{actual\ size}$

Examples:

1/50,000 scale map of Winnipeg means 1 unit on map = 50,000 units in reality. So 1 cm on map is 50,000 cm actual, so 1 cm on map is 500 m, so one cm is 0.5 km

5 : 1 scale is a 'blow up' enlargement. 5 units on the picture of the bug is really one unit actual

Useful Conversions

Metric Conversions: **1 km = 1,000 m**; 1 m = 100 cm; **1 cm = 10 mm**
Imperial Conversions: 1 ft = 12 in; **1 yd = 3 feet**; 1 mile [mi] = 5,280 ft
Metric ↔ Imperial : **3.28 ft = 1 m**; 1 in = 2.54 cm; **1 km = 0.62 mi**

PROBLEM SOLVE METHODS

Guess and Check; Draw Diagram; **Make List**; Work Backwards (ie: Algebra); **Use Formula**; Use Tables; **Make into Simpler Problem(s)**; Use Logic; **Estimate**; Make sure not **M**issing **I**nformation (maybe there is actually a solution, maybe you need more info!!)

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