FORMULAE

MASS & VOLUMETRIC COVERSIONS

1 US gallon = 3.78 litres. 1 UK (Imperial) gallon = 4.54 litres. 1 IMP GAL =1.2 USG 1 IG = 1.2 USG (4.54/3.78) 1 Kg = 2.2 pounds (lbs) 1 litre x specific gravity = 1 Kg 1 Knot = 0.515 meter/sec	$1NM = 6080\ FEET = 1.852KM$ $1SM = 5280FEET = 1.61KM$ $1KM = 3280FEET$ $1M = 3.28FEET$ $1M = 100CM = 1000MM$ $1CM = 10MM$

PET/PSR/CP

$DISTANCE\ TO\ PET\ OR\ CP = \frac{D \times H}{O + H}$	$TIME\ TO\ PET\ OR\ CP = \frac{DISTANNCE\ TO\ PET}{O}$

$Dpnr = \frac{E \times O \times H}{O + H}$	$Tpnr = \frac{E \times H}{O + H}$

$E(Endurance) = \frac{FOB - RESERVE}{(FUEL\ CONSUMPTION)}$	$Dpnr = \frac{FOB - RES}{\left[\left(\frac{F\backslash Co}{O}\right) + \left(\frac{F\backslash CH}{H}\right)\right]}$

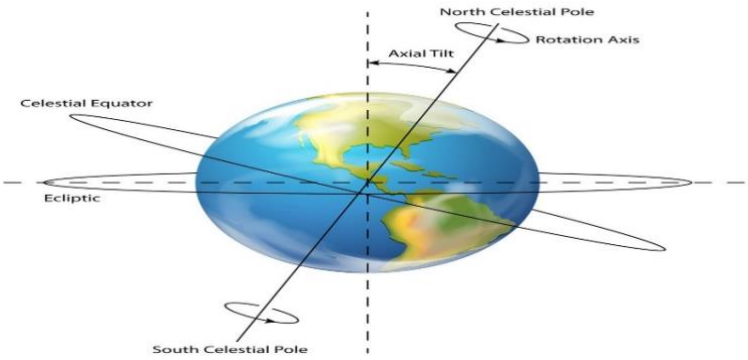
$HW\backslash TW = V \times COS\theta$	$X\backslash W = V \times SIN\theta$

"WHERE θ = ANGLE BETWEEN RUNWAY DIRECTION & WIND DIRECTION"

$$MACH\ NO = \frac{TAS}{LSS}$$

BASIC NAVIGATION

SHAPE OF EARTH – OBLATE SPHEROID/ ELLIPSOID



$ED = 6888NM$

$PD = 6865NM$

$$COMPRESSION = \frac{ED - PD}{ED}$$

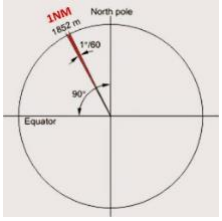
$$COMPRESSION\ RATIO\ AS\ \% = (1\backslash 300) * 100 = 0.3\%$$

EARTH ROTATION- WEST TO EAST

ROTATION OF EARTH VIEWD FROM:

NORTH POLE	ANTICLOCKWISE (OVER NP)
SOUTH POLE	CLOCKWISE(BELOW SP)

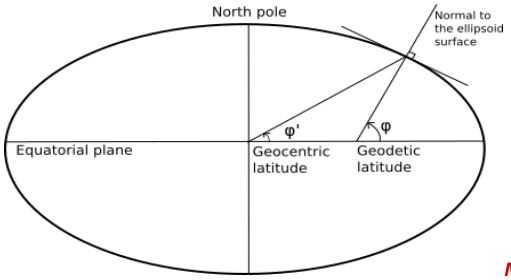
1-60 RULE:



1MINUTE = 1NM = 1852 METRES

$1° = 60' = 60NM = (60 \times 1.852)KM = 111.12KM$

GEODETIC & GEOCENTRIC LATITUDE:



MAX DIFFERENCE OCCURS AT 45˚N/S BETWEEN GC & GD =11.6 MINUTES.

DEPARTURE

$GC\ DISTANCE = CH° \times 60$
$RL\ DISTANCE = CH° \times 60 \times COS\ \theta$

NOTE- EARTH AT 60 DEG N/S IS H THE SIZE OF EARTH AT EQUATOR

CONVERGENCY

$CONVERGENCY = GC\ DEPARTURE - GC\ ARRIVAL$	$CONVERGENCY = CH\ LONG \times SINE\ MEAN\ LATITUDE$
$CONVERSION\ ANGLE = \frac{1}{2} \times CONVERGENCY$	$CONVERSION\ ANGLE = {}^{1}/_{2} \times CH\ LONG\ IN\ DEG \times SINE\ MEAN\ LAT$

GC READINGS	***EAST***	***WEST***
NORTHERN HEMISPHERE	INCREASE **'I'**	DECREASE **'D'**
SOUTHERN HEMISPHERE	DECREASE **'D'**	INCREASE **'I'**

EAST '–' WEST '+'

VARIATION EAST MAGNETIC LEAST ; VARIATION WEST MAGNETIC BEST

DEVIATION EAST COMPASS LEAST ; DEVIATION WEST COMPASS BEST

COMPASS HDG	*DEVIATION*	*MAGNETIC HDG*	*VARIATION*	*TRUE HDG*
HDG(T)	*DRIFT*	*TMG*	*TRACK ERROR*	*TRACK REQUIRED*

DRIFT PORT HDG MORE ; DRIFT STARBOARD HDG LESS

SOUTHERN / NOTHERN VERTEX :

CHANGE NORTH LATITUDE TO SOUTH AND VICE VERSA

ADD 180 DEG TO LONGITUDE

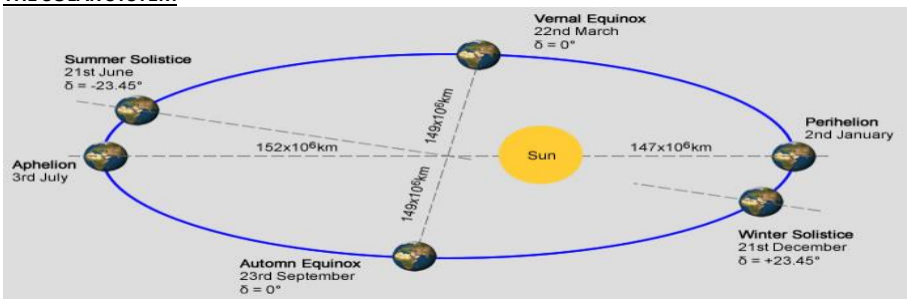
SOUTHERN / NOTHERN VERTEX FROM EQUATOR:

ADD 90 DEG & SUBSTRACT 90 DEG FROM LNGITUDE WHERE GC CUTS EQUATOR

MAPS & CHARTS

$\frac{DA}{DB} = \frac{COSA}{COSB}$	$SCALE = \frac{CHART\ LENGTH}{EARTH\ LENGTH}\ (in\ same\ units\ pref\ cms)$

THE SOLAR SYSTEM



TIME

LONGITUDE EAST GMT LEAST, LONGITUDE WEST GMT BEST

$HOUR\ ANGLE = \frac{LONGITUDE}{15\ DEG}$

$15° = 1\ HOUR$

FLIGHT PLANNING

$HT(feet) = A \times R(nm) \times 101$	$ROD(fpm) = A \times GS \times \frac{100}{60}$
$\% = \frac{HT}{RANGE} \times 100$	$\% = \frac{ROD}{GS} \times \frac{6000}{6080}$