AVIATION RULES OF THUMB

1) Altimeter correction for non-standard pressure

'From high to low, look below'
1 mb = 30 feet

FL 270 QNH 977
ISA - 36 mb → 36 x 30 = 1080 feet
Altitude = 25920 feet

2) Altimeter correction for non-standard temperature

'From high to low, look below'
Corr (feet) = 4 x Δ ISA x $\frac{\text{altitude (feet)}}{1000}$

FL 300 ISA - 6°C
Corr = 4 x 6 x 30 = 680 feet
Alt = 29320 feet

3) SAT out of TAT

SAT (°C) = TAT (°C) - 3 x Mach

TAT = -17 °C Mach 0.64
SAT = -17 – 3 x 6 = -17 - 18 = -35 °C

4) SAT out of TAT for higher Mach and lower Temp

SAT (°C) = TAT (°C) - (100 x Mach) - 50

TAT = -31 °C Mach 0.74
You have 24 above M 0.50
SAT = -31 -24 = -55 °C

5) Level Off procedure if R/C ≤ 1000 feet/min (also for descent R/D)

Δ feet = $\frac{\text{R/C (feet/min)}}{10}$

Climbing to FL 210 R/C = 2000 feet/min
Δ feet = 200 feet → start level off at 20800 feet

6) Level Off procedure if R/C > 1000 feet/min (also for descent R/D)

Δ feet = 2 x $\frac{\text{R/C (feet/min)}}{10}$

Climbing to FL 300 R/C = 2500 feet/min
Δ feet = 500 feet → start level off at 29500 feet

7) Cruise Flight Level computation

Cruise FL = Trip Distance (NM)

EBBR-EBOS = 60 NM
Optimum is FL 60

8) Vertical Speed to rejoin assigned altitude

V/S (feet/min) = 2 x Δ feet

If on 6250 feet instead of 6000 feet, correct with V/S = 500 feet/min

9) To obtain TAS out of Mach-number (high altitudes - cruise)

TAS (kt) = 6 x Mach

M 0.72
TAS = 420 kt

10) To find TAS out of IAS and FL

TAS (kt) = IAS (kt) + $\frac{\text{FL}}{2}$

FL 300 IAS = 240 kt
TAS = 240 + 150 = 390 kt

11) Ground Speed out of Mach

GS (NM/min) = 10 x Mach

M 0.72
GS = 7,2 NM/min

12) Drift computation in cruise

Drift (°) = X-wind (kt) / Mach

M 0.7 X-wind 35 kt
Drift = 35 / 7 = 5°

13) Drift computation out of TAS (not IAS, unless during approach)

Drift (°) = X-wind (kt) / speed number

TAS 180 kt X-wind 36 kt
Drift = 36 / 3 = 12°

14) To find Ground Speed with DME station available

GS (kt) = 10 x distance (NM) in 36s

Read distance covered in 36 seconds towards or away from station

15) Off-Track distance

Off-Track Distance = ∆° x distance to station / 60

9° off track 11 NM from station
Off-Track Distance = 9 x 11 / 60 = 99 / 60 = 1.6 NM

16) Slant distance overhead a DME – station

each 6000 feet altitude → 1 NM DME

Overhead station FL 330
you will read 33000 / 6000 = 5.5 NM on DME

17) Intercepting outbound leg when close to the VOR-DME station (valid for Mach 0.7)

1 NM for each ∆30°

FL 330 Inbound on R-180 (Hdg N) to track 060 outbound
Start your turn to 060 at 2 NM before (+ slant 5.5NM)

18) Intercept Heading when passing over station before turning to outbound Heading

Attack (°) = 1/3 x ∆Track (°)

Inbound on 180 (Hdg N) to track 060 outbound
Take Heading 080 overhead Station to intercept Radial

19) Intercept Heading when a little bit off-track

Attack (°) = 3 x Off-Track angle (°)

On R-310 outbound instead of R-315
Take attack 15° to rejoin

20) Top of Descent (Idle thrust - 3° descent path)

TOD (NM) = ∆ FL / 3

FL 280 down to 2000 feet
TOD = 260 / 3 = 87 NM

21) R/D required to be down at certain point

R/D (feet/min) = speed number x altitude (feet) / distance (NM)

Descent 17000 feet in the next 28 NM TAS 240 kt
R/D = 4 x 17000 / 28 = 2400 feet/min

22) Vertical speed by changing Body Attitude (valid for high speeds)

R/D (feet/min) = Mach x ∆BA (°)

Mach 0.74 → One degree BA results in 740 feet/min

23) Vertical speed by changing Body Attitude (valid for lower speeds)
Use TAS or IAS in approach

R/D (feet/min) = speed number x ∆BA (°)

Speed TAS 420 kt BA 3 degrees down
R/D = 7 x 3 = 2100 feet/min

24) Distance required if you want to maintain a certain R/D profile

Distance (NM) = $\frac{\text{speed number x altitude (feet)}}{\text{R/D}}$

Descent 23000 feet at 1000 feet/min TAS 300 kt
Distance = 5 x 23 = 115 NM

25) Wind correction for descent distance

Wind Corr (NM) = 10% for each 40 kt component

Example Thumbrule 20) with 20 kts Tailwind
Add 58 to 87 = 92 NM

26) R/D required to follow a certain glide %

R/D (feet/min) = Ground Speed (kt) x %

TAS 350 kts 20 kts tailwind Glide 3° = 5%
R/D = 370 x 5 = 1850 feet/min

27) Conversion % versus degrees for glide path

% = $\frac{\text{10 x degrees}}{\text{6}}$

ILS 3° Glide Slope → 30 / 6 = 5%

28) Start the roll-out from a turn when

ΔHeading (°) to go = $\frac{\text{Bank (°)}}{\text{3}}$

Bank 25° Right turn to Hdg 080
Start roll-out 8° in advance, thus on Hdg 072

29) Amount of Bank required for a turn

Bank (°) = Δ Heading (°)

Heading North Right to Heading 007
Take 7° Bank

30) Bank required for a rate one turn

Bank (°) = 15% TAS (kt)

TAS 180 kt Rate one turn
Bank = 18 + 9 = 27°

31) Turn diameter of a rate one turn

Diameter (NM) = $\frac{\text{TAS (kt)}}{\text{100}}$

TAS 150 kt
Turn Φ = 1,5 NM

32) Outbound timing for a base turn, when not mentioned on the chart

Time (min) = $\frac{\text{36}}{\Delta\text{Track}}$

ILS Rwy 27 (QFU 270) Teardrop 066 outbound
Time = 36 / (090-066) = 1,5 min

33) R/D to follow the glide slope ILS 3° = 5%

R/D (feet/min) = 5 x Ground Speed (kt)

On Glide Slope TAS 140 kt 10 kt Tailwind
R/D = 750 feet/min

34) Visibility required to see threshold at VDP (Non-Precision Approach)

Vis (m) = 6 x MDA (feet)

MDA 430 feet
Visibility = 6 x 430 feet = 2500 m

35) Memorize this table 1/60

speed (kt)	120	150	180	210	240	270	300	330
speed number	2	2½	3	3½	4	4½	5	5½

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