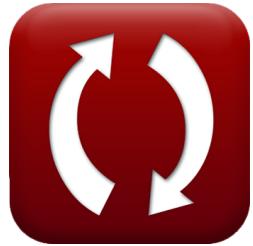




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Pull Up and Pull Down Maneuver Formulas

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List of 12 Pull Up and Pull Down Maneuver Formulas

Pull Up and Pull Down Maneuver

1) Load Factor given Pull-Down Maneuver Radius

$$fx \quad n = \left(\frac{V_{\text{pull-down}}^2}{R \cdot [g]} \right) - 1$$

[Open Calculator !\[\]\(a870788d6ed9b8fd294b7654a8c8526b_img.jpg\)](#)

$$ex \quad 1.199973 = \left(\frac{(797.71 \text{m/s})^2}{29495.25 \text{m} \cdot [g]} \right) - 1$$

2) Load Factor given Pull-Down Maneuver Rate

$$fx \quad n = \left(\frac{V_{\text{pull-down}} \cdot \omega_{\text{pull-down}}}{[g]} \right) - 1$$

[Open Calculator !\[\]\(c50c8b7b2cc2cf9ff925edec0ee94c0d_img.jpg\)](#)

$$ex \quad 1.199993 = \left(\frac{797.71 \text{m/s} \cdot 1.5496 \text{degree/s}}{[g]} \right) - 1$$



3) Load Factor given Pull-UP Maneuver Radius ↗

fx $n = 1 + \left(\frac{V_{\text{pull-up}}^2}{R \cdot [g]} \right)$

[Open Calculator ↗](#)

ex $1.2 = 1 + \left(\frac{(240.52 \text{m/s})^2}{29495.25 \text{m} \cdot [g]} \right)$

4) Load Factor given Pull-Up Maneuver Rate ↗

fx $n_{\text{pull-up}} = 1 + \left(V_{\text{pull-up}} \cdot \frac{\omega}{[g]} \right)$

[Open Calculator ↗](#)

ex $1.489704 = 1 + \left(240.52 \text{m/s} \cdot \frac{1.144 \text{degree/s}}{[g]} \right)$

5) Pull-down maneuver radius ↗

fx $R = \frac{V_{\text{pull-down}}^2}{[g] \cdot (n + 1)}$

[Open Calculator ↗](#)

ex $29494.89 \text{m} = \frac{(797.71 \text{m/s})^2}{[g] \cdot (1.2 + 1)}$



6) Pull-Down Maneuver Rate ↗

fx $\omega_{\text{pull-down}} = [g] \cdot \frac{1 + n}{V_{\text{pull-down}}}$

Open Calculator ↗

ex $1.549605 \text{ degree/s} = [g] \cdot \frac{1 + 1.2}{797.71 \text{ m/s}}$

7) Pull-up maneuver radius ↗

fx $R = \frac{V_{\text{pull-up}}^2}{[g] \cdot (n - 1)}$

Open Calculator ↗

ex $29495.23 \text{ m} = \frac{(240.52 \text{ m/s})^2}{[g] \cdot (1.2 - 1)}$

8) Pull-Up Maneuver Rate ↗

fx $\omega = [g] \cdot \frac{n_{\text{pull-up}} - 1}{V_{\text{pull-up}}}$

Open Calculator ↗

ex $1.142355 \text{ degree/s} = [g] \cdot \frac{1.489 - 1}{240.52 \text{ m/s}}$



9) Velocity for given Pull-Down Maneuver Rate ↗

fx $V_{\text{pull-down}} = [g] \cdot \frac{1 + n}{\omega_{\text{pull-down}}}$

Open Calculator ↗

ex $797.7125 \text{m/s} = [g] \cdot \frac{1 + 1.2}{1.5496 \text{degree/s}}$

10) Velocity for given Pull-Up Maneuver Radius ↗

fx $V_{\text{pull-up}} = \sqrt{R \cdot [g] \cdot (n - 1)}$

Open Calculator ↗

ex $240.5201 \text{m/s} = \sqrt{29495.25 \text{m} \cdot [g] \cdot (1.2 - 1)}$

11) Velocity for given Turn Rate for High Load Factor ↗

fx $v = [g] \cdot \frac{n}{\omega}$

Open Calculator ↗

ex $589.3843 \text{m/s} = [g] \cdot \frac{1.2}{1.144 \text{degree/s}}$

12) Velocity given Pull-down Maneuver Radius ↗

fx $V_{\text{pull-down}} = \sqrt{R \cdot [g] \cdot (n + 1)}$

Open Calculator ↗

ex $797.7149 \text{m/s} = \sqrt{29495.25 \text{m} \cdot [g] \cdot (1.2 + 1)}$



Variables Used

- n Load Factor
- $n_{\text{pull-up}}$ Pull-Up Load Factor
- R Turn Radius (*Meter*)
- v Velocity (*Meter per Second*)
- $V_{\text{pull-down}}$ Pull-Down Maneuver Velocity (*Meter per Second*)
- $V_{\text{pull-up}}$ Pull-Up Maneuver Velocity (*Meter per Second*)
- ω Turn Rate (*Degree per Second*)
- $\omega_{\text{pull-down}}$ Pull-Down Turn Rate (*Degree per Second*)



Constants, Functions, Measurements used

- Constant: **[g]**, 9.80665

Gravitational acceleration on Earth

- Function: **sqrt**, $\text{sqrt}(\text{Number})$

A square root function is a function that takes a non-negative number as an input and returns the square root of the given input number.

- Measurement: **Length** in Meter (m)

Length Unit Conversion 

- Measurement: **Speed** in Meter per Second (m/s)

Speed Unit Conversion 

- Measurement: **Angular Velocity** in Degree per Second (degree/s)

Angular Velocity Unit Conversion 



Check other formula lists

- [High Load Factor Maneuver Formulas](#) ↗
- [Pull Up and Pull Down Maneuver Formulas](#) ↗

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