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Attractive Force Potentials Formulas

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List of 13 Attractive Force Potentials Formulas

Attractive Force Potentials

1) Attractive Force Potentials per unit Mass for Moon

Open Calculator

fx $$V_M = \frac{f \cdot M}{r_{S/MX}}$$

ex $$5.7E\hat{}17 = \frac{2 \cdot 7.35E22kg}{256km}$$

2) Attractive Force Potentials per unit Mass for Moon given Harmonic Polynomial Expansion

Open Calculator

fx $$V_M = (f \cdot M) \cdot \left(\frac{R_M^2}{r_m^3}\right) \cdot P_M$$

ex $$5.1E\hat{}17 = (2 \cdot 7.35E22kg) \cdot \left(\frac{(6371km)^2}{(384467km)^3}\right) \cdot 4.9E\hat{}6$$

3) Attractive Force Potentials per unit Mass for Sun

Open Calculator

fx $$V_s = \frac{f \cdot M_{sun}}{r_{S/MX}}$$

ex $$1.6E\hat{}25 = \frac{2 \cdot 1.989E30kg}{256km}$$

4) Attractive Force Potentials per unit Mass for Sun given Harmonic Polynomial Expansion

Open Calculator

fx $$V_s = f \cdot M_{sun} \cdot \left(\frac{R_M^2}{r_s^3}\right) \cdot P_s$$

ex $$1.4E\hat{}25 = 2 \cdot 1.989E30kg \cdot \left(\frac{(6371km)^2}{(150000000km)^3}\right) \cdot 3E14$$

5) Distance from Center of Earth to Center of Moon given Attractive Force Potentials

Open Calculator

$$r_m = \left(R_M^2 \cdot f \cdot [\text{Moon-M}] \cdot \frac{P_M}{V_M}\right)^{\frac{1}{3}}$$

$$371480.3\text{km} = \left((6371\text{km})^2 \cdot 2 \cdot [\text{Moon-M}] \cdot \frac{4.9\text{E}\hat{}6}{5.7\text{E}17}\right)^{\frac{1}{3}}$$

6) Mass of Moon given Attractive Force Potentials

Open Calculator

$$M = \frac{V_M \cdot r_{S/MX}}{f}$$

$$7.3\text{E}\hat{}22\text{kg} = \frac{5.7\text{E}17 \cdot 256\text{km}}{2}$$

7) Mass of Moon given Attractive Force Potentials with Harmonic Polynomial Expansion

Open Calculator

$$M = \frac{V_M \cdot r_m^3}{[\text{Earth-R}]^2 \cdot f \cdot P_M}$$

$$8.1\text{E}\hat{}22\text{kg} = \frac{5.7\text{E}17 \cdot (384467\text{km})^3}{[\text{Earth-R}]^2 \cdot 2 \cdot 4.9\text{E}\hat{}6}$$

8) Mass of Sun given Attractive Force Potentials

Open Calculator

$$M_{sun} = \frac{V_s \cdot r_{S/MX}}{f}$$

$$2\text{E}\hat{}30\text{kg} = \frac{1.6\text{E}25 \cdot 256\text{km}}{2}$$

9) Mass of Sun given Attractive Force Potentials with Harmonic Polynomial Expansion

Open Calculator

$$M_{sun} = \frac{V_s \cdot r_s^3}{[\text{Earth-R}]^2 \cdot f \cdot P_s}$$

$$2.2\text{E}\hat{}30\text{kg} = \frac{1.6\text{E}25 \cdot (150000000\text{km})^3}{[\text{Earth-R}]^2 \cdot 2 \cdot 3\text{E}14}$$

10) Mean Radius of Earth given Attractive Force Potentials per Unit Mass for Moon

Open Calculator

fx $$R_M = \sqrt{\frac{V_M \cdot r_m^3}{f \cdot M \cdot P_M}}$$

ex $$6706.089\text{km} = \sqrt{\frac{5.7\text{E}17 \cdot (384467\text{km})^3}{2 \cdot 7.35\text{E}22\text{kg} \cdot 4.9\text{E}\hat{}6}}$$

11) Mean Radius of Earth given Attractive Force Potentials per Unit Mass for Sun

Open Calculator

fx $$R_M = \sqrt{\frac{V_s \cdot r_s^3}{f \cdot M_{sun} \cdot P_s}}$$

ex $$6726.728\text{km} = \sqrt{\frac{1.6\text{E}25 \cdot (150000000\text{km})^3}{2 \cdot 1.989\text{E}30\text{kg} \cdot 3\text{E}14}}$$

12) Moon's Tide-generating Attractive Force Potential

Open Calculator

fx $$V_M = f \cdot M \cdot \left(\left(\frac{1}{r_{S/MX}}\right) - \left(\frac{1}{r_m}\right) - \left([\text{Earth-R}] \cdot \frac{\cos\left(\theta_{m/s}\right)}{r_m^2}\right)\right)$$

ex $$5.7\text{E}\hat{}17 = 2 \cdot 7.35\text{E}22\text{kg} \cdot \left(\left(\frac{1}{256\text{km}}\right) - \left(\frac{1}{384467\text{km}}\right) - \left([\text{Earth-R}] \cdot \frac{\cos(12.5^\circ)}{(384467\text{km})^2}\right)\right)$$

13) Tide-generating Attractive Force Potential for Sun

Open Calculator

fx $$V_s = (f \cdot M_{sun}) \cdot \left(\left(\frac{1}{r_{S/MX}}\right) - \left(\frac{1}{r_s}\right) - \left(R_M \cdot \frac{\cos\left(\theta_{m/s}\right)}{r_s^2}\right)\right)$$

ex $$1.6\text{E}\hat{}25 = (2 \cdot 1.989\text{E}30\text{kg}) \cdot \left(\left(\frac{1}{256\text{km}}\right) - \left(\frac{1}{150000000\text{km}}\right) - \left(6371\text{km} \cdot \frac{\cos(12.5^\circ)}{(150000000\text{km})^2}\right)\right)$$

Variables Used

- **f** Universal Constant
- **M** Mass of the Moon *(Kilogram)*
- M_{sun} Mass of the Sun *(Kilogram)*
- P_M Harmonic Polynomial Expansion Terms for Moon
- P_s Harmonic Polynomial Expansion Terms for Sun
- r_m Distance from center of Earth to center of Moon *(Kilometer)*
- R_M Mean Radius of the Earth *(Kilometer)*
- r_s Distance *(Kilometer)*
- $r_{S/MX}$ Distance of Point *(Kilometer)*
- V_M Attractive Force Potentials for Moon
- V_s Attractive Force Potentials for Sun
- $\theta_{m/s}$ Angle made by the Distance of Point *(Degree)*

Constants, Functions, Measurements used

- Constant: **[Earth-R]**, 6371.0088
  Earth mean radius
- Constant: **[Moon-M]**, 7.3458E+22
  Moon mass
- Function: **cos**, cos(Angle)
  Cosine of an angle is the ratio of the side adjacent to the angle to the hypotenuse of the triangle.
- Function: **sqrt**, sqrt(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 Kilometer (km)
  Length Unit Conversion
- Measurement: **Weight** in Kilogram (kg)
  Weight Unit Conversion
- Measurement: **Angle** in Degree (°)
  Angle Unit Conversion

Check other formula lists

- **Attractive Force Potentials Formulas**

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