Flipping Physics Lecture Notes:

The Force of Gravitational Attraction between the Earth and the Moon
https://www.flippingphysics.com/earth-moon-gravity.html

Example: According to NASA, the mass of the Earth is 5.97 x 10^{24} kg, the mass of the Moon is 7.3 x 10^{22} kg, and the mean distance between the Earth and the Moon is 3.84 x 10^{8} m.♥ What is the force of gravitational attraction between the Earth and the Moon?

$$\textbf{Knowns: } m_{Earth} = 5.97\times10^{24}\,kg;\ m_{Moon} = 7.3\times10^{22}\,kg;\ R_{E-M} = 3.84\times10^{8}\,m;\ F_g = ?$$

$$F_g = \frac{Gm_1m_2}{r^2} = \frac{Gm_Em_M}{R_{E-M}{}^2} = \frac{\left(6.67\times10^{-11}\right)\left(5.97\times10^{24}\right)\left(7.3\times10^{22}\right)}{\left(3.84\times10^{8}\right)^2}$$

$$\Rightarrow F_g = 1.97134\times10^{20} \approx \boxed{2.0\times10^{20}N}$$

There are a number of things wrong with the following calculations:

$$\sum F_{moon} = F_{EM} = m_m a_m \Rightarrow a_m = \frac{F_{EM}}{m_m} = \frac{1.97134\times10^{20}}{7.3\times10^{22}} = 0.0027005\frac{m}{s^2} \approx 0.0027\frac{m}{s^2}$$

$$\Delta x = v_i\Delta t + \frac{1}{2}a\Delta t^2 \Rightarrow 3.84\times10^{8} = \left(0\right)\Delta t + \frac{1}{2}\left(0.0027005\right)\Delta t^2$$

$$\Rightarrow \Delta t = \sqrt{\frac{\left(2\right)\left(3.84\times10^{8}\right)}{0.0027005}} = 533288\,\text{sec}\left(\frac{1hr}{3600\,\text{sec}}\right)\left(\frac{1day}{24hr}\right) = 6.17231 \approx 6.2days$$

It is important you understand what is wrong with them though…
I'd watch the video because I detail what is wrong with the above calculations there.

Also, if you want to learn more about Universal Gravitation, please visit:
http://www.flippingphysics.com/algebra.html#ug

♥ https://nssdc.gsfc.nasa.gov/planetary/factsheet/